News of the Industry Begins Page 102

AUTOMOTIVE INDUSTRIES

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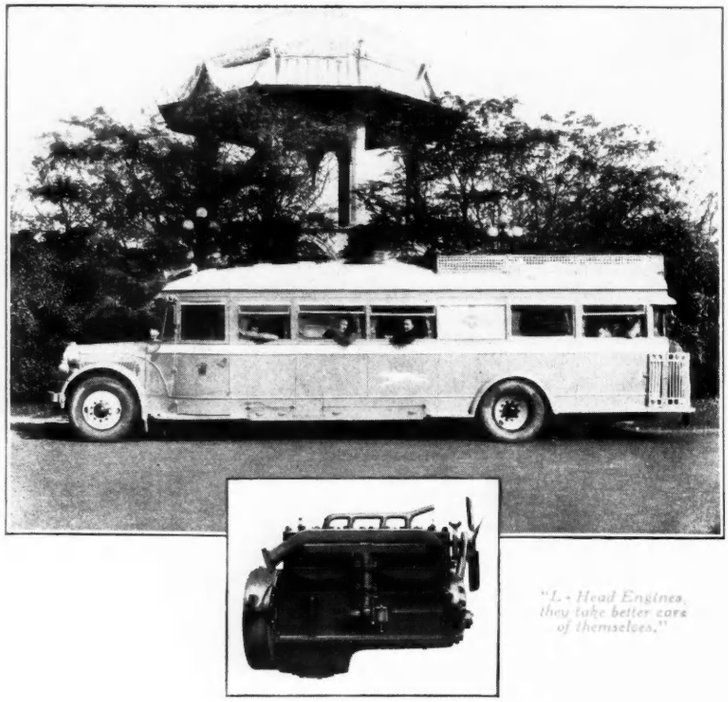
New Greyhound Lines Sleeping Coach Powered by Waukesha Engines



"L-Head Engines, they take better care of themselves."

A Pullman car on rubber tires, a motor equipped with standard sleeping berths, diner and observation parlor—must be driven by a perfect power plant.

For this palace on wheels there should be no unpleasant engine vibration—reliability of course could not be sacrificed—and so to meet the rigid service requirements, the Waukesha "Big Bus Sixes" were chosen.

Waukesha Big Bus Sixes are positively self-effacing. 3½-inch diameter crankshafts, "girder" type crankcases, "truncated" cylinders, full-pressure filtered oil lubricating system, and fuel-saving Ricardo heads—these features insure long vibrationless service.

Waukesha heavy-duty, six-cylinder bus engines are built in sizes ranging from 50 H. P. to 120 H. P. Write for Bulletin describing the size that fits your needs.

901

AUTOMOTIVE EQUIPMENT DIVISION

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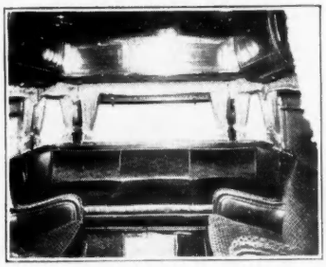
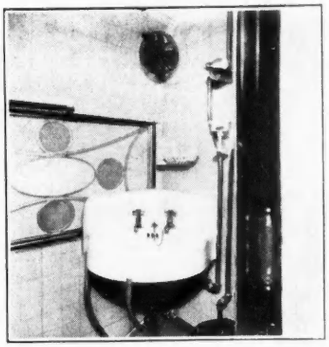
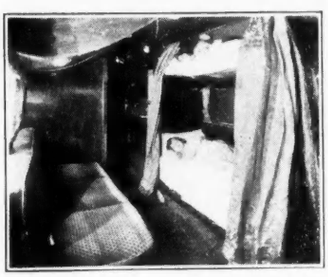


Between the forward and rear compartments is a compact kitchenette, with electric refrigerator, gas range, pantry locker, kitchen sink, and hot and cold running water. From the kitchenette, light lunches, beverages, etc., are served.

The rear compartment is made up as a spacious combination observation parlor and dining room. It is equipped with dining and card tables, radio, phonograph and electric fans.



To the left of the kitchenette is a complete tile walled bathroom with wash basin, toilet and shower bath. Hot water for this and the kitchen sink is supplied from a standard home-size coil heater.



Finished in polished walnut and deep mohair upholstery, the interior is a model of luxury and convenience. The forward compartment provides standard Pullman type berths for nine passengers.

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THE AUTOMOBILE

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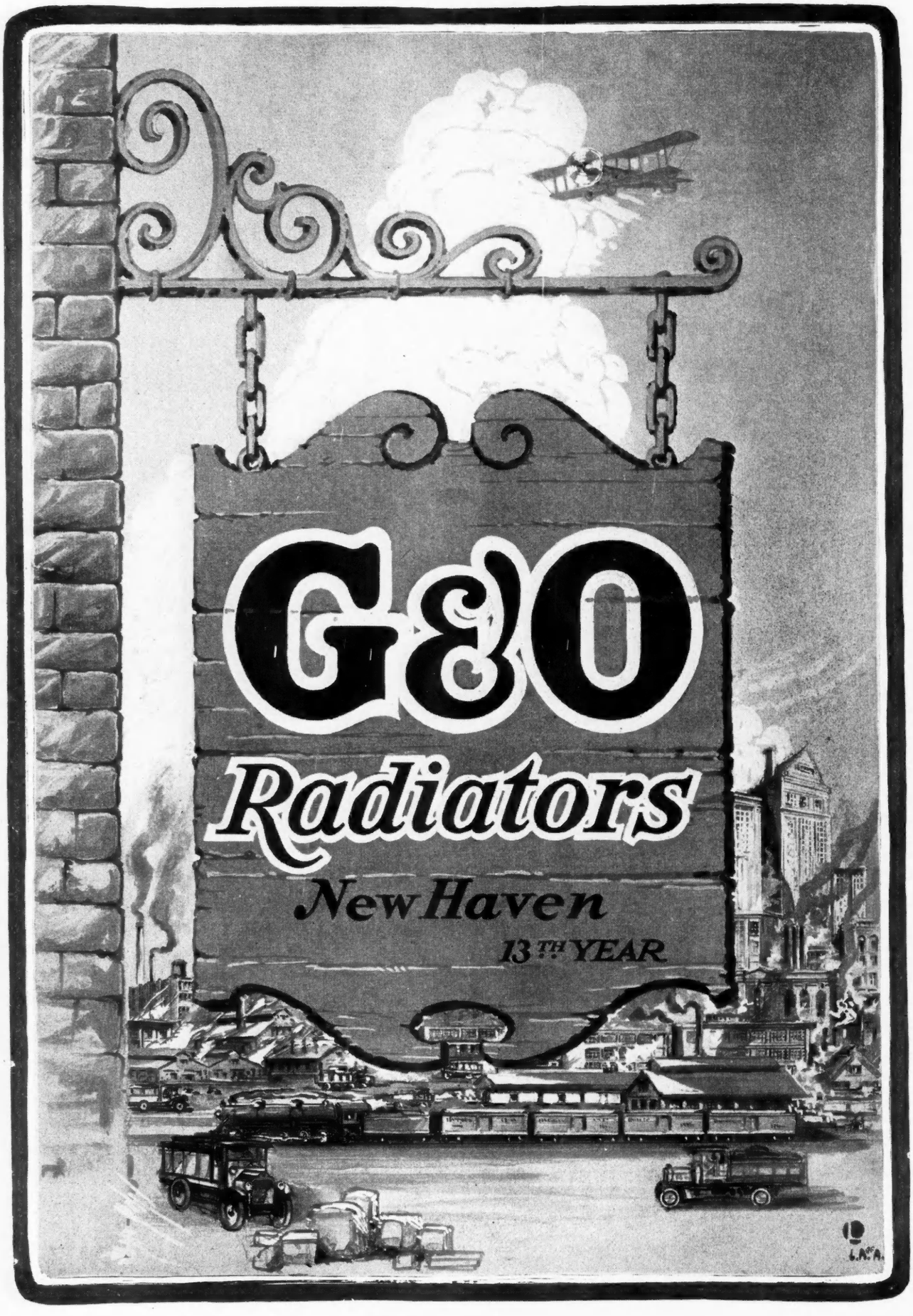
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AUTOMOTIVE INDUSTRIES
VOLUME 60 *Philadelphia, Saturday, January 19, 1929* NUMBER 3

Cady B. Durham, vice-president, Buick Motor Co.

Future Production *Economies* Must Come *from* Management —Says Cady Durham

By A. F. Denham

NO, we haven't," said Mr. Durham—and those who know him also know that when Cady Durham says "No," his manner of expressing it leaves no doubt at all as to his meaning.

We had asked whether he thought we had reached the ultimate in effecting manufacturing economies in the production of automotive vehicles, not because we thought the industry had, but because we wanted his ideas of where future major economies were coming from. That is what we asked him next. And—

"From production management," answered Mr. Durham. "Future economies when they come—and they certainly are coming—will have to come from the management end. It's just a matter of changing our viewpoint. In some ways it is like the question of saturation we heard so much about even in the early days of the industry. There isn't so much being said about that now, not because we have decided that there is no such thing as saturation, but because we now think of it in terms of sales rate. That's more or less what we will have to do with production from now on if we get anywhere.

"You can't quite define it, but here is an example," said Mr. Durham, when we asked him just how he would express this new viewpoint in production management. "In some of the best plants it is considered that the cost reduction limit has been pretty well approached as far as the workingman is concerned. True enough—he can do just so much in a nine-hour day or whatever it is, and no more. But if we consider him as a production unit we have to talk in terms of efficiency, and when I say efficiency I don't mean whether he should turn a wheel before he throws a lever, or throw the lever first, but what his efficiency is in relation to the rest of the production process.

"What we all are after of course is increased pro-

duction per man-hour, although we might call it lower cost of production. It means the same thing. Suppose we see then how we can increase production. In the first place, the man in the average shop has to worry too much about getting his material from the previous operation and getting rid of it after he has finished his operation. What we need here is more automatic material handling equipment. Conveyorizing of plants can rarely be overdone. The big saving which conveyors produce is the increased efficiency of the workingman. One of the biggest things we ever did at Buick, in the line of cost reduction, was the installation of our latest continuous assembly lines.

"Here is another angle: Our estimates show that floor space costs around $3 per square foot. At the present time the average operator and his equipment require about 48 sq. ft. of floor space. Production management ought to cut that down by better grouping of consecutive operations, and more efficient use of floor space. I don't mean we ought to crowd everything together. If we do that we get into other troubles. Accidents become more frequent, production tie-ups of one kind or another happen oftener, and we make it harder for the maintenance men to get at machine tools that need servicing. One way of increasing the efficient use of our floor space is to keep materials moving and eliminate materials storage wherever possible.

Automatic Machinery

"How about automatic machinery? Our studies at Buick certainly show that this is not the whole answer. Automatic machinery, of course, plays an important part in the manufacture of automobiles but we can't just say: 'Let's use an automatic here and cut down on the floor space this operator requires.' We are always hearing it said that increased production with automatic machinery is cutting down employment. Several years ago we had one operator running six automatics. Now we have one operator for every two machines, and have to have two more men for the other four machines. Every time we increase our production rate our automatics become less automatic.

"What we need is further improvement in machine tools themselves. A most important step right now is the development of higher speed cutting steels. During the past few years machine tools have been much improved, from a structural standpoint, with the result that in most cases there is more rigidity than is essential with the cutting steels used at present. Higher speed steels would re-establish the balance, and, of course, give us greater production capacity, or lower cost, whichever way you want to look at it.

"Another problem the machine tool industry should get after is excessive vibration. We never worried much about vibration in automobiles until we found by cutting it down we could not only make automobiles more comfortable but could make higher, safer road speeds mechanically possible. The same is true of machine tools. In times past we had plenty of trouble trying to cut gears at high production speeds. The equipment we now have certainly licked the problem—simply because a progressive company really got after this question of vibration and got rid of it.

"The problem of increasing our production isn't entirely up to the machine tool manufacturer. One thing we need is a better control of materials. Suppose we make a batch of forgings of which 90 per cent machine easily but the other 10 per cent is too hard. What happens? The 10 per cent spoils enough tools and causes enough production troubles to offset the advantages of the good 90 per cent. By setting up and taking more advantage of our production research divisions, such as the metallurgical department, greater uniformity of materials may be attained.

"No, I don't believe major manufacturing economies without a change in the art of automobile design may be expected to emanate from the design end. We've tried it, not once but at regular intervals. Every so often we go over our cars from stem to stern, not in a general way, but by taking each individual part and looking it over to see whether we could change it so as to be able to make it cheaper, quicker and better. More pressed-steel parts might help and they might not. Generally we find that when we try to substitute a pressed-steel part for a forging to make it lighter, the new part isn't strong enough.

"By close coordination with the designing engineers much has been accomplished in reducing sizes of steels; standardizing of bolts, taps, etc., and we have made wonderful savings.

"Take the question of non-productive materials. I wonder how many production managers realize what they are spending for these items. We didn't know but we found out and it is plenty. About 1924 we started to analyze our costs of such materials on only a few items. Now we have an entirely separate research division set up to look after this end, keeping records on well over 100 different items, and the list is still growing.

Cutting Down Costs

"Just let me give you a few examples of what these studies have meant to us. In 1924 we were spending $1 for belting for every car we produced in our plant. Now our cost is down to less than 23 cents. On the basis of a production of 1200 motors daily this means a saving of $1,000 per day. Wait a minute—here are some more. Files: In 1924 we were spending 28 cents per car built. Now the cost is down to 8 cents. That doesn't mean we are doing less filing, but we know more about what kind of files to use, how to

Cady Durham

What we need is more automatic material handling equipment. Conveyorizing of plants can rarely be overdone.

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\+ + +

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Says:

The company that wants to keep in the swim must watch the cost of every little detail down to brooms and mop pails.

\+ + +

My idea of a real foundry is to pour ore in at one end and take out finished castings at the other.

\+ + +

The big thing is to get men to think, to see the advantages of education early in life to help them advance.

\+ + +

Some of the best ideas come from the men in the shop.

resharpen them, and what to do with worn files. For instance, the boys of the foundry use files which have been 'scrapped' in other departments but are perfectly good for filing cores. Here are some more: 15 cents for factory wipers per car in 1927 as against 31 cents three years earlier. We just went ahead and found out what kind of materials were needed for each specific purpose. We provided containers for the deposit of soiled rags and actually budgeted the issuing of rags in the same manner as we do productive materials.

"We applied the same methods of cataloging, buying on specifications and analysis of departmental requirements to minor tolos. Ordinary grinding disks cost us 15 cents per car produced in 1924. We cut this to 9 cents in 1927. Taps, 25 cents in 1924 and less than 19 cents last year. The company that keeps in the swim is going to have to watch all these details, down to brooms and mop pails, and it can't be done without proper production management.

"What manufacturing department do I consider as offering the greatest opportunity for cost reduction? I should say that the foundry is probably the worst neck in the bottle when we try to get higher production per man-hour. It is true we have accomplished much in improving foundry practice. Our new foundry at Buick eliminates a tremendous amount of manual handling of materials with its elaborate conveyor and automatic handling methods, but still it seems to me that there ought to be a simpler way of getting castings than the way we get them at present.

"My idea of a real foundry is to pour ore in one end and take out finished castings at the other. This may seem like a far-fetched dream and it probably is with the present constitution of our foundries. It would require a complete revolutionizing of foundry practice. Just casting from the cupolas as attempted by some manufacturers isn't the answer unless you don't care what kind of cast iron you get. One of the most important functions of the foundry man is to maintain a close control over materials used so as to cut down the work in the machine shop.

"It is quite possible that this revolutionizing of foundry practice may not come out of the automotive industry. We are too close to it. Look at what happened to the paint industry only a few years ago. Practically overnight all their development work was made practically useless as far as the automobile was concerned when an entirely distinct industry introduced pyroxylin lacquer."

A Suggestion from the Shop

While we were talking a colored messenger from the Buick print shop came into the office and laid before us copies of the Buick Bulletin. Mr. Durham picked up his copy and pointed to one of the feature stories, dealing with a suggestion for a quick-acting safety stop for a semi-automatic toggle press, suggested by one of the men in the shop and adopted for all the presses in that particular line.

"There is another source of ideas for cutting costs." commented Mr. Durham. "That's what comes from education. Some of the best ideas for labor-saving devices and short cuts come from the men in the shop, but invariably these have come from workmen who knew what it was all about, who had a little wider range of vision than just what concerned the particular operation they were working on at the time. The big thing is to get men to *think*, to see the advantages of education early in life to help them to advance. Just this morning we were discussing the case of one of our men in the shop whose potential capacity is far above that of the work he is doing, but who just doesn't seem to be able to see that he can't climb the ladder without a better foundation in the principles of manufacturing.

"Education should also help us to reduce our labor turnover costs. I believe we can justly claim that here at the Buick Motor Company we have as low a labor turnover as can be found anywhere in the in-

(Continued on page 97)

Mr. Durham is also somewhat of a production man with rod and rifle, as these snapshots show

Proportion of *Low-Priced Cars* Sold *Remains* Fairly Constant

Past figures indicate that makers in under-$800 class can expect to sell about 2,110,000 cars this year.

By Donald Blanchard

SUPPOSE Ford had been able to build all the cars his dealers could sell in the last two years, or, in other words, had made the shift from the Model T to the Model A with only a short interruption in production—would the total number of cars sold in the under-$800 price group have been materially larger?

Did the low-price section of the market shrink relatively during the decline of the Model T and has it expanded during the rise of the Model A?

The answers to these two questions are of practical importance in assaying the prospects for 1929. Concerning them, the sales figures for the last three years give inconclusive but significant data. The proportion of cars sold under $800 fell in 1927, when Ford activity was at the ebb, by a figure too great to ignore but too small to be accepted as a positive indication.

In 1928 the low-priced section showed a relative increase over 1927, and approached the 1928 percentage despite the fact that Ford for a large part of the year was hardly more of a factor in the market than he was in 1927. Then too, in the later months, the steadily expanding rate of Ford Model A production did not result in any gain in the under-$800 field relative to the market as a whole. The proportion, although greater than in the previous year, held fairly steady through the 12 months.

In short, there is ammunition for the argument that the Ford situation in the last two years has not affected materially the total volume of business in the low-priced field but simply has changed the distribution of this business among the various makes.

There are numerous corollaries to this proposition, all more or less valid. For one, that not very many buyers stayed out of the market when Ford was out of production. For another, that the sharp drop in sales in 1927 can be largely attributed to a slackening in general business conditions rather than to the drop in Ford activity. Finally, that continued Ford expansion would cut materially into the business of other producers in the low-priced class. Of course none of these points is statistically proved, nor is there any assurance that Ford can attain, or even approach, his old position and hold it for any considerable length of time.

Three-Year Sales Analysis

At the present time, the following lines of cars all have five-passenger closed models listing at less than $800: Chevrolet, Durant Four and 60, Essex, Ford, Overland-Whippet, Plymouth and Pontiac. Sales of these cars for the last three years with 1928 partly estimated have run from 59 to 63.6 per cent of the total volume of all makes, as shown by Table 1 herewith.

Inasmuch as prior to the introduction of the Plymouth no separate figures are available for the Chrysler Four and because of the dropping of the Star name, some estimates are involved in the totals for the low-price group, but the possible error in these estimates is not large enough to have any effect.

These figures show that during the last three years sales in the under-$800 field have averaged 61.3 per cent of total cars sold. In 1926, when Ford was capable of capacity production for the entire year, sales of low-price cars represented 63.6 per cent of the total. In 1927, when he was out of production for half of the year and operating on a very limited scale during the other half, low-price sales represented 59 per cent. In 1928 Model A output expanded steadily

TABLE 1

	Under-$800 Group	Total All Makes	Under-$800 as Per Cent of Total
1926	2,095,882	3,298,933	63.6
1927	1,541,746	2,623,538	59.0
1928	1,835,000	3,000,000	61.2
	5,472,628	8,922,471	61.3

yet low-price sales at 61.3 per cent of the total were right in line with the average for this group for the last three years.

The monthly record of 1928 (see Table 2) tells the same story, although Model A passenger car production was expanding rapidly.

TABLE 2

	Under-$800 Group	Ford	Total All Makes	Under-$800 Group as Per Cent of Total
January	76,081	2,432	135,843	56
February	101,016	4,930	165,256	61
March	153,442	16,162	254,723	60
April	199,384	24,902	332,056	60
May	215,925	30,298	351,332	62
June	200,440	35,436	317,032	63
July	203,189	43,094	324,021	63
August	202,969	62,677	329,827	61
September	166,126	60,492	271,177	61
October—Based on 24 States	145,000	62,000	239,000	61
	1,518,572	342,423	2,720,267	61.2

Ford sales increased from 2432 in January to 62,000 in October, yet in no month except January is there any material variation in the percentage of total sales from the average of 62.

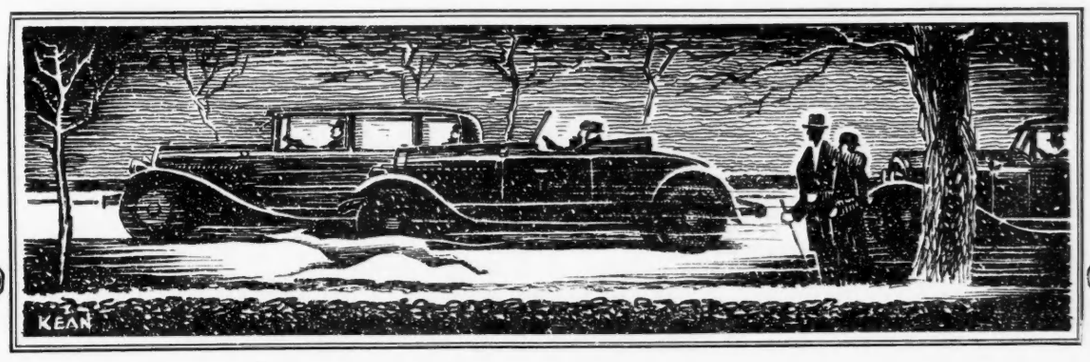
In view of all this, what of 1929?

Assuming for the coming year that about 64 per cent of the cars sold in the United States will list under $800, and a total retail domestic market of 3,300,000—high on the basis of past records, but rather low in light of the unusually optimistic predictions now being made—then roughly 2,110,000 cars will be sold in the low-priced field.

There begin to be very strong and well-founded doubts whether Ford will reach the 10,000 a day which he has set as his goal, even for a brief period. The recent survey by *Automotive Industries* indicated that the bank of unfilled orders held by Ford dealers in the United States had sustained heavy inroads, and that in some sections and for some models immediate or only slightly delayed deliveries were the rule. In other words, on the basis of the production early in December of 6000 units daily (say 4500 cars for domestic consumption) output was not tremendously behind demand.

The figures could be shuffled in an unlimited number of ways, but calculations of this character are largely academic, since the distribution of sales among makers is the hardest of all factors to appraise in advance.

At the very least, however, an entirely unprecedented rigor of competition in the low-priced field is forecast for 1929, unless there is a very large expansion in the foreign and domestic markets in the year, and the low-priced group gains in relation to the others. Even this is possible in our remarkable industry, and it may be that all, or nearly all, the low-priced producers will fare well in the ebb and flow of 1929 fortunes.



Three New High-Speed Diesels Exhibited in Germany

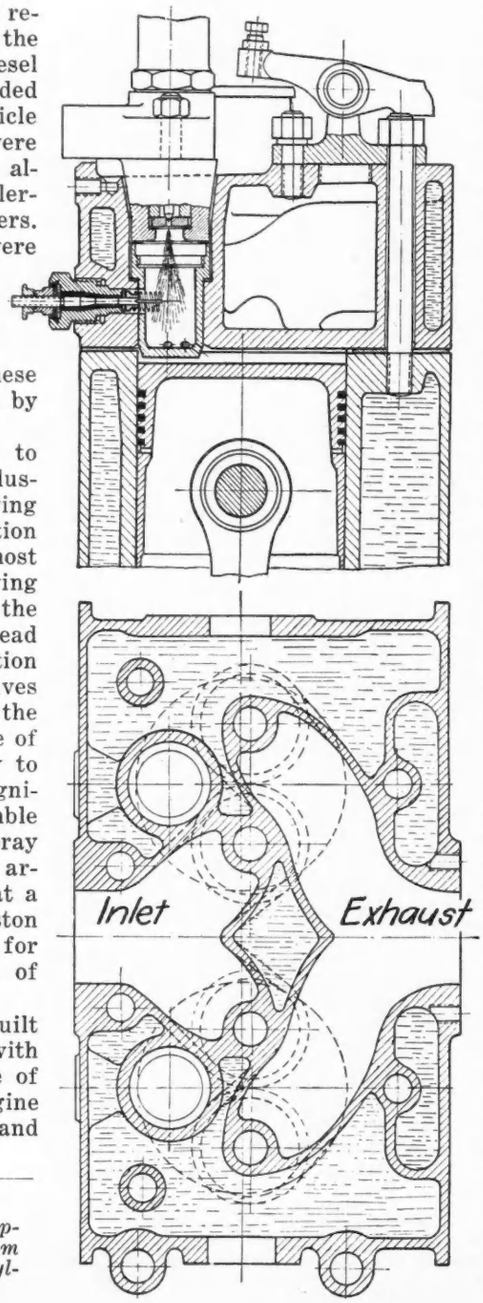
Deutz, Krupp and Koerting Brothers enter field with displays at Berlin show. Novel design features.

By P. M. Heldt

THE opportunity of another review of developments in the line of high speed light Diesel engines in Germany was afforded by the recent Berlin motor vehicle show. Several new designs were presented in addition to those already known, such as the Daimler-Benz, M.A.N., Junkers and others. Descriptions of the engines were given in *Der Motorwagen* and *Auto-Technik*, and the following information is based on articles in these publications. It is noteworthy that all of these engines are being manufactured by large, long-established firms.

The Deutz engine is similar to the Daimler-Benz, recently illustrated in these columns, in having an ante-chamber or an ignition chamber. It differs from most other engines of this type in having the ignition chamber located in the cylinder head to one side, instead of in the center. A central ignition chamber limits the size of valves which can be accommodated in the head, and the reason for the use of the offset chamber is obviously to remove this limitation. The ignition chamber inset is of thimble form and has a number of spray openings in its lower end, so arranged as to direct the spray at a considerable angle to the piston head. A hot-wire igniter, used for starting, screws into the side of the cylinder head.

The Deutz engine is being built in four and six-cylinder types, with a bore of 4.53 in. and a stroke of 6.69 in. The four-cylinder engine develops 55 hp. at 1250 r.p.m. and the six-cylinder 85 hp. at the same speed. The four-cylinder engine, inclusive of electric starter and generator, weighs about 1320 lb. or 24 lb. per horsepower, while the six-cylinder engine weighs 1630 lb. or about 19 lb. per horsepower. The engine is intended principally for marine and industrial purposes, but also for tractors and trucks.



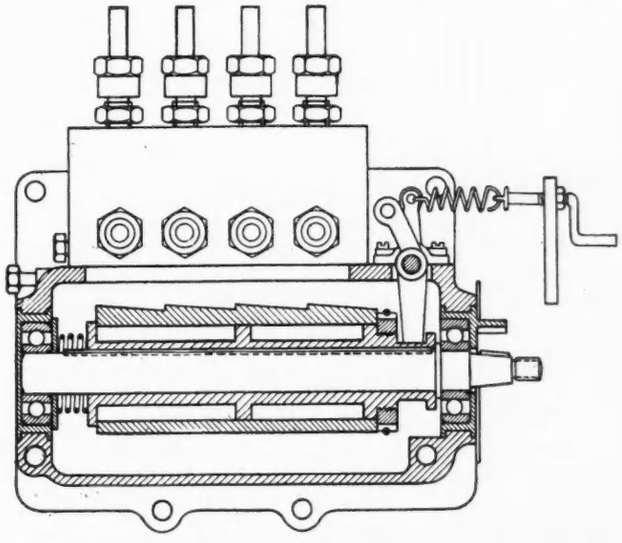
Top—Vertical section through upper part of Deutz engine. Bottom —Horizontal section through cylinder head

Cylinders are of cast iron and are cast in three blocks of two each, while the crankcase is of aluminum alloy. The crankshaft is supported in five bearings in the four-cylinder and in seven bearings in the six-cylinder model. Bearing caps are very heavily ribbed and are held in place by "through" bolts, some of which extend up as far as the bottom flanges of the cylinders, while others extend up all the way to the top of the cylinder heads.

The valves are operated from the camshaft in the crankcase through side rods and rocker levers. Camshaft drive is through gears with helical teeth which are located just inside the flywheel. This arrangement of the camshaft drive gears is not very popular because of their comparative inaccessibility, but it is used here because the nodal point of the crankshaft with respect to torsional vibration is located a short distance ahead of the flywheel, and by placing the gears in this position they are made to operate more silently and their life is added to.

The fuel injection is regulated by means of the inclined, slidable cams which operate the fuel pump plungers through the intermediary of rocker levers. Longitudinal and cross sections through the pump are shown herewith. The cams for all of the four pump plungers are made in a single piece which is mounted on a center that can be

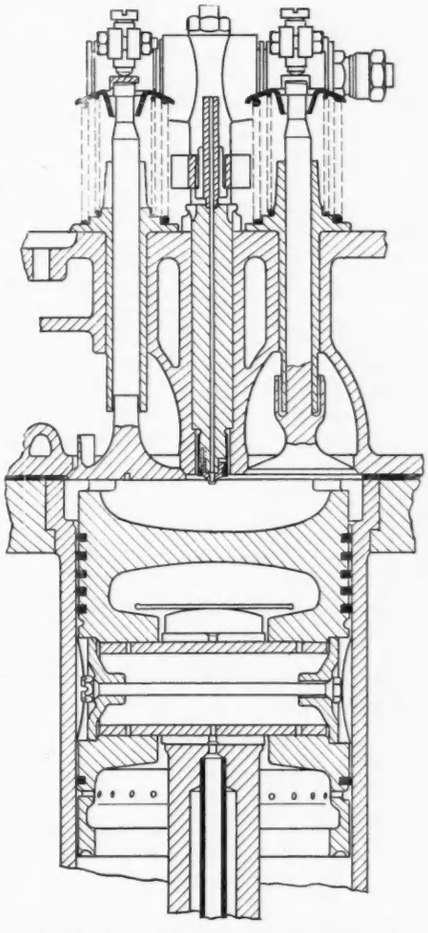
slid along its shaft on a feather key. Presumably the roller followers are made barrel-shaped instead of cylindrical, as else there would be line contact only. The fuel pump plungers are moved outward to perform the suction stroke by heavy coiled springs,



and are then returned for the delivery stroke by the cams. No means are provided for adjusting the delivery of the individual pumps, but in their manufacture the pumps are checked so that the difference between the minimum and maximum delivery does not exceed 5 per cent of the delivery when the engine is idling. Means are provided whereby the begin of injection can be varied by hand.

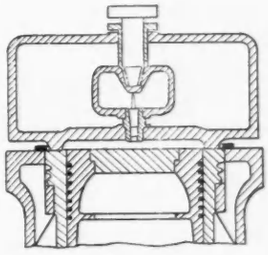
A novel feature of the engine consists in the use of a device similar to an impulse starter as used on heavy gasoline engines, particularly tractor engines. This is inserted in the drive between the engine and the fuel pump. When the engine turns over slowly, as in cranking, a spring is wound up, and at the proper time for fuel injection this spring is released, and causes the fuel pump to operate faster, and consequently to produce a higher pressure, than if it were positively connected to the engine. The higher injection pressure at low speed is desirable because it produces finer atomization.

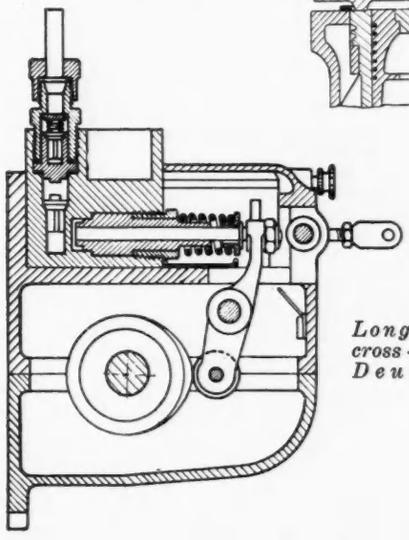
Starting is effected by means of an electric starter, and to reduce the starting torque required a handwheel is operated previous to switching on the starting current, which shifts the camshaft in such a way as to bring auxiliary cams into operation which prevent compression in the engine, and which also shift the fuel pump cams into the no-delivery position. After the engine has attained some speed, the handwheel is turned in the opposite direction, which has the effect of placing one cylinder after another under compression and simultaneously starting the corresponding



Vertical section of upper part of Krupp engine

Sketch showing ignition chamber of Koerting engine





Longitudinal and cross-section of Deutz duel pump

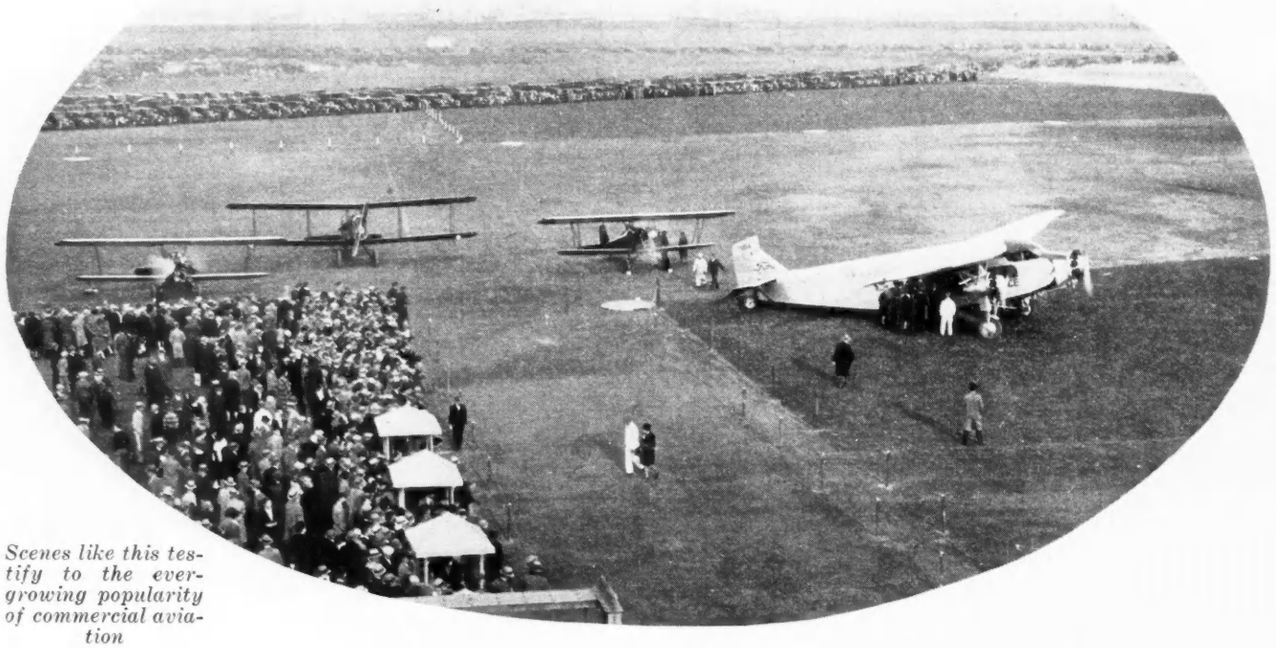
fuel pumps. If the engine is already warm it is not necessary to "decompress" and to use the auxiliary hot wire igniter, but merely to press on the starter button.

The Krupp engine, which also is made in four and six-cylinder types, uses direct injection. It has a bore of 5.32 in. and a stroke of 7.87 in., and the horsepower ratings are 65 and 100 respectively. Light alloys are extensively used in the design, both the pistons and connecting rods being made of them. The fuel injection nozzle is of the open type and is located in the cylinder head between the two poppet valves. Cylinder heads are cast in one block for two cylinders. An interesting feature is a heat protecting sleeve for the exhaust valve guide, as shown in the drawing. The inlet valve is provided with a deflector of the bottom of its head, which is designed to increase the turbulence. These engines are being manufactured in the Krupp Germania Works in Kiel which has had extensive experience in building Diesel engines for submarines.

The firm of Koerting Brothers in Hannover is building an engine of the ignition chamber type. In this case there is a single small-diameter channel of communication between the ignition chamber and the combustion chamber and the fuel is sprayed onto the wall of this channel, which, like the ignition chamber itself, is water-cooled. Toward the end of the compression stroke the air flows from the combustion chamber into the ignition chamber at a high rate of speed, and at

(Continued on page 97)

"Big Business" *Takes* a Hand



Scenes like this testify to the ever-growing popularity of commercial aviation

WITHIN the last few months almost the entire aeronautical industry has undergone a financial readjustment, in most cases involving reorganization and the introduction of new capital from outside sources. Almost over night stories of mergers and rumors of bigger mergers began developing with such rapidity that the mind hardly could grasp the significance of one before another was on top of it. In most of these instances, new capital was brought in and the industry, which but a short time ago was considered to be rather a struggling infant, began to be talked of in millions as large as many another industry.

There are so many significant features of this development as to be almost bewildering. In the first place there has been noticeable a greater tendency than ever before for bankers and men of other large business affiliations to invest in this industry. These men have been notoriously timid about placing much of their money, or of money under their control, in a business which they have regarded as unsafe and uncertain. There have been exceptions to this rule for some time in the case of three or four companies of established reputation in the field, but bankers and other business men have recently taken a sudden fancy to aviation securities that has spread to the less well-known groups.

It is impossible to estimate how much money has come into the industry during the past few months, but analysis of a few of the recent recapitalizations will give some idea of the larger companies and groups and will indicate the magnitude of the present trend.

The first of the recent mergers involved directly no new financing but it seemed to start the ball rolling, and it was significant of the trend in other respects. This was the announcement that Keystone Aircraft Corp. of Bristol, Pa., and Loening Aeronautical Engineering Corp. of New York had merged by an exchange of outstanding Loening stock for new Keystone stock. Aside from the significance of the merger itself, it is interesting to note that this brings together under the influence at least of Richard F. Hoyt, partner in the banking house of Hayden Stone & Co., one of the leading manufacturers of amphibian planes and well-known manufacturer of military planes, that had just announced plans for the production of de luxe commercial planes. Further, Mr. Hoyt is chairman of the board of Wright Aeronautical Corp., and has recently been interesting himself in a number of other aeronautical enterprises and rumor has been strong that there will be mergers involving the rest of these interests. Only recently it was announced that Hayden Stone and another banking house, Jackson and Curtis, had together purchased the Travelair Manufacturing Co., thus introducing the possibility of making a third plane manufacturing member of the group producing smaller commercial planes. This last possibility, however has been somewhat discounted.

Buy Control of Fokker

Following closely upon this announcement, came one that Western Air Express had secured control of Fokker Aircraft Corp., and was going to expand the latter's operations in the East and establish a new plant for it in the West. The principal backers of this are Harris M. Hansue, president of Western Air Express and West coast financier, and James A. Talbot, president of the Richfield Oil Co. of California. Another prominent

in Aeronautic Development

Millions in new capital poured into industry by bankers and business men during last few months.

By A. B. Crofoot

VARIOUS authorities on the subject have during the last few years expressed the opinion that the aeronautic industry needed more than anything else the magic touch of "Big Business" to accelerate its development. The accompanying article pretty well establishes the fact that this touch has been provided.

"Big Business," meaning capital and experienced management, has decided apparently that the time is ripe for serious investment in this new field of transportation. During recent months millions of capital have been put into the industry by hard-headed bankers and industrialists who make it a rule to invest only when there is every cause to expect a reasonable return.

The financing and refinancing which has been going on in the industry, the scope of some of the organizations which have been created and the caliber of the men who are working behind the scenes will come as a revelation to many who read the article.

aviation figure appearing in this reorganization is Louis H. Piper, president of the Universal Aviation Corporation, which has also recently organized. The remaining directors of the new Fokker company are bankers, attorneys and capitalists from New York, San Francisco, Wheeling and Philadelphia. New capital amounting to $4,000,000 was brought into the Fokker company by this reorganization.

Perhaps the most significant from the point of view of introducing banking interests into the industry was the recent reorganization of the Boeing interests. W. E. Boeing, president of the companies bearing his name, together with the National City Bank of New York and its West coast correspondent, the Pacific National Bank of Seattle, first organized the Boeing Airplane and Transportation Corporation to take over and operate the Boeing Airplane Company, manufacturing aircraft, and the Boeing Air Transport, Inc., and Pacific Air Transport, two operating companies. This new company was floated with authorized preferred stock of $10,000,000 of which $4,500,000 was immediately outstanding, and this outstanding preferred stock, it is estimated, just about took care of the absorption of the original companies. In addition, there are outstanding 545,000 shares of the authorized 650,000 shares of no par common stock. These shares were placed on the market at $590 a unit, consisting of ten shares of preferred $50 par stock and three shares of common, thus placing the common on a basis of about $30 a share. Outstanding common stock then would stand at about $16,000,000 with a reserve of authorized but unissued common and preferred stock reaching over another $8,500,000. Stock in the former Boeing companies was privately held, while the new stock is traded in the New York Curb Market.

$150,000,000 Merger

This merger had not been in effect more than two or three months when a new merger was announced involving this company and two other important factors in the industry. The newest grouping involving this company was at the time of its announcement the largest single enterprise in the industry, controlling companies whose stock at the market was estimated to be valued at about $150,000,000. United Aircraft & Transport Company was organized to take over the business and assets of Boeing Airplane and Transport, Pratt & Whitney Aircraft Co., and Chance Vought Corp. This consolidates one of the big Western groups consisting of airplane manufacturers and operaters with one of the biggest and best-known engine makers and a prominent Eastern airplane manufacturer. National City Company and its Western correspondent, the Pacific National Bank, are also behind this enlarged and powerful corporation.

This particular merger was rather looked upon as a probability at the time of the formation of the enlarged Boeing Corporation. Fred B. Rentschler, president of Pratt & Whitney Aircraft, and Chance M. Vought, president of the company bearing his name, both appeared on the board of directors of Boeing Airplane and Transport and it was fairly evident that their interest in this company was more than personal investment.

There has been a number of other more or less important recapitalizations in the manufacturing and operating field lately. New capital was put into Bellanca Aircraft Corporation, for example, when a group of New York, Boston and Detroit bankers purchased the holdings of the DuPonts in this company and added about $2,000,000 to the financial structure. This addition was needed to increase plant facilities in order that the company might fill large orders, one of which alone calls for 300 planes during 1929.

Another development is the recent formation of Great Lakes Aircraft Corporation which took over the plant of the Glenn L. Martin Company at Cleveland, Ohio, and announced that in addition to the military and naval planes formerly made by the Martin Company production would be started on a line of commercial planes. This company was floated with the issuance of 200,000 shares of Class A stock at $24.50 a share and 300,000 shares of Class B stock. Authorized capital includes 500,000 shares of each type of stock. These shares are traded in on the Chicago Stock Exchange.

William Robert Wilson, formerly president of the Murray Corp. of America, is president of the Great Lakes Aircraft Corporation. In addition to his former direct connection with the automotive industry he was recently president of the Guardian Trust Co., Detroit,

and was formerly vice-president of the Irving National Bank. George W. Mason, formerly works manager for Chrysler, and Arthur I. Philip, formerly connected with Dodge Brothers, are also on the board of directors of this company. Two-thirds of the 300,000 shares of Class B stock of this company is owned by Allied Motor Industries, Inc., formerly the Henney Motor Co. of Freeport, Ill.

Swallow Airplane Company, too, has just recently issued 24,000 additional shares of stock. These shares, at date of issue, were priced at $15 a share, thus bringing into the treasury of the company $360,000 additional capital which is to be used "for expansion purposes."

Following shortly on the Swallow new capital floatation, Cessna Aircraft Company offered 7500 shares of new stock at $17.50, and almost immediately thereafter the formation of General Aero Corporation of America was announced as a holding concern for these two companies.

Another recent reorganization was the formation of the Douglas Aircraft Company, Inc., to take over the assets and business of the Douglas Company of Santa Monica, Cal. This new company, too, brings in new capital from banking interests and falls under the wing of C. M. Keys.

Universal Aircraft Corp.

It will be noticed from the foregoing that transport or operating companies have played a part in these mergers and refinancing almost as important as have the manufacturing companies. There are two other outstanding examples of this same tendency taking place almost entirely within the operating field although both these instances, as will be seen later, are closely tied into the trend of merging in the manufacturing field. One of these is the Universal Aviation Corporation, which in itself is made up of nine operating companies but which, as has already been indicated, is closely allied with one of the recently reorganized manufacturing companies. This new company, which involves some $6,000,000 capital, takes in the lines operated by Universal Air Lines, Inc., Robertson Aircraft Corporation, Northern Air Lines and six smaller companies. These are Universal Air Lines System Terminal Co., Midplane Sales and Transit Co., Northrup Airplane Co., Air Transportation, Inc., Egyptian Airways, Inc., and Robertson Flying Schools, Inc.

Of the $6,000,000 involved, $5,000,000 is new capital, the existing investments being valued at about $1,000,000. This new company now operates lines between Chicago and Cleveland, Chicago and Minneapolis and St. Paul, Chicago and Omaha via St. Louis and Kansas City, Minneapolis and Duluth and Minneapolis and Fargo, besides a number of shorter lines. In addition it plans to put into operation lines from St. Louis to Dallas, via Tulsa, and from Dallas to Columbus with intermediate stops in Illinois.

The other recently expanded operating company is the Pan-American Airways, Inc., designed to operate between points on the East coast and points in Central America. This company was originally formed to operate between Key West and Havana, but it is now planned for the lines to extend to Cuba, Haiti, the Dominican Republic, to San Juan, Porto Rico and eventually to Colon. Joint arrangements are being made between this company and the Atlantic Coast Line Railway and the Florida East Coast Railway for through passenger service on the air-rail basis similar to that announced by the Transcontinential Air Transport. This service is to begin early in the year.

These are but a few of the many reorganizations and recapitalizations that have taken place during the past few months. A recent survey of the state securities commissions throughout the country conducted by the Better Business Bureau shows that up to the end of August this year, 72 new promotional aviation projects were admitted to sale with a capitalization of $11,926,400. This compares with 43 projects in all of 1927 with total authorized capital of $27,572,500. Most of the really large projects have been floated since the end of August, so that it is impossible to estimate without making a daily check of these commissions what the total new capital authorized in the industry is.

In addition to these formations of companies merging interests of already existing companies, there has been a number of financing companies organized to aid in the forming and capitalizing of infant endeavors in all branches of the industry. These companies are organized for the express purpose of buying up securities in aircraft manufacturing companies, airports, air transport lines and other companies entering the field who need money. Some of these companies are backed by men who are sufficiently familiar with the industry to have a reasonable degree of judgment in their investments, but there is grave danger in this field in general. In this phase of the investment in aviation, perhaps more than in any other, it is a case of investment in personalities rather than in physical assets.

Under such circumstances, where a young industry has reached the stage where expansion is rapid, where public fancy has been touched and money is obtainable in almost any amounts, it is inevitable that there should be a decided mushroom growth, and that much of this growth should be unhealthy. As it has been in other industries there can be no doubt that certain of the companies now being so gallantly launched and expanded are unsound. These will ultimately die out and those which are solidly founded will doubtless continue to expand, their rate of expansion being ultimately determined by the conditions of general business. The present activities remind one in many ways of the early days of the railroads and the more recent days when the automobile passed from the realm of the novel to the realm of practical utility and a tool of commerce.

Three Groups Competing

Anyone analyzing the recent activities cannot help but note a definite lining up of the industry into three or four definite groups each with its own manufacturing and operating units. There are a few of the strong companies that are as yet independent of these groups, but a clear line of demarkation has manifested itself and there are today three distinct groups competing for the transcontinental transport business, and each is amply backed as to sources of equipment.

Largest of these is what might be caller the T.A.T| group, centering around Transcontinental Air Transport. This company is backed by C. M. Keys, guiding genius of all the Curtiss companies; National Auto Transport, and the Pennsylvania and Santa Fe Railroads. Through Keys, this group has Curtiss Aeroplane and Motor Company as a source of planes and motors. Most of the transport purchased by T.A.T., however, have been Ford or Fokker monoplanes, as Curtiss has in the past devoted most of its manufacturing activities to military planes. Also included in this group is Curtiss Flying Service, Inc., which controls the sale of the product of Sikorsky Manufacturing Corporation and of Ireland Aircraft, Inc.

The Sikorsky company, which recently underwent a partial internal reorganization, manufactures amphibian aeroplanes. The flying service also maintains air taxis in various cities and handles the merchandis-

ing of other allied products. Mr. Keys is also vice-president of Curtiss-Robertson Airplane Manufacturing Company, manufacturing Curtiss Robin passenger planes, and is likewise chairman of the executive committee of National Air Transport, one of the oldest and best established air transport lines and coorganizer of Transcontinental Air Transport. There are also members of boards of directors of these various enterprises who are actively directing other companies in the field, and there is always a strong possibility of further alliance developing.

A second strong competitor for transport business is the Western Fokker combination, already mentioned in the discussion of reorganizations. The fact that L. H. Piper, president of Universal, also mentioned above, is a large stockholder and director in Fokker, points to the possibility of alliance between these two large operating groups, and a tendency on the part of Western Air Express to branch out toward the East in attempt to establish transcontinental routes. Further color is lent to this surmise by the announcement made some time ago by Universal that arrangements had been made with the New York Central Railroad whereby through passengers could obtain a joint railroad-air trip similar to that offered by T.A.T.

A Powerplant Tie-up

So far there appears no direct connection between this group and manufacturers of aircraft powerplants, but it might possibly be regarded as significant that among those interested in Universal, assuming that there is a connection between Universal and Western, is the Robertson family which is also linked through the Curtiss-Robertson company with the Keys interests. If this roundabout connection can be taken as indicative of any real community of interest, there is available for this group such powerplants as it is likely to need.

The third group is more completely organized as a comprehensive unit and has already been described in this discussion. It is the United Aircraft & Transport Co., organized vertically with Boeing Airplane Co. and Chance Vought Corp. manufacturing planes, Pratt & Whitney manufacturing motors, and Boeing Air Transport and Pacific Air Transport furnishing its operating end. This merger is regarded by many as but one of the logical moves resulting from the trend under discussion.

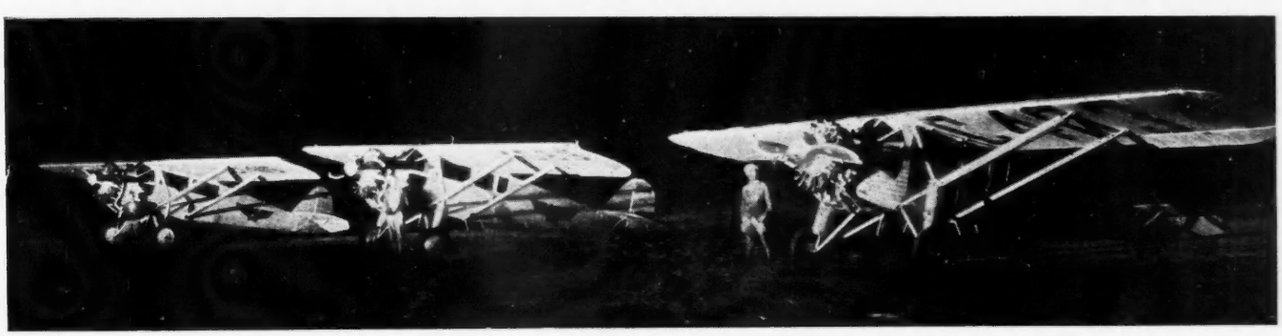
There also appears to be another group on the horizon but this fourth group seems to be more or less closely allied with the Keys group. This is the group backed by R. F. Hoyt, partner in Hayden Stone & Co. He is chairman of the board of Wright Aeronautical Corp., and is actively behind the merged Keystone Loening group and the Pan-American Airways, thus giving him active interests in engine and plane manufacturing companies and in operating lines as well. Likewise he is actively interested in Transcontinental Air Transport and is represented in other companies falling logically into the Keys group. For this reason there is a certain possibility felt that a definite alliance may develop between these two groups, or it may be that they will merely maintain friendly relations without any real alliance.

From all these facts, three or four noteworthy trends stand out. In the first place, aviation is now advanced to a stage where the investing public is beginning to feel that its future is assured and hence is willing to put its money into it. This growth in appeal to the investing public has been coupled with sufficient growth in its market to lead the industry into a program of expansion on a broad scale. Production programs of the individual manufacturers for 1929 totaled up would show an output for the year of something in the neighborhood of 30,000 planes. Those, however, who are in a position to observe the industry keenly and to analyze the situation carefully, while fully convinced of the fact that commercial aviation has "arrived" and that it will grow, place the possible production for next year at anywhere from between 5000 and 6000 to possibly 10,000. Production during 1928 has run about 4000. Too rapid expansion in financing, and the production of planes faster than capable pilots can be turned out to operate them, with resulting loss of life and equipment, are regarded as quite apt to result in a reaction before long, which while not in the nature of a permanent setback, will probably cause some reductions in schedules and bring some of the over-expanded companies crashing to the ground.

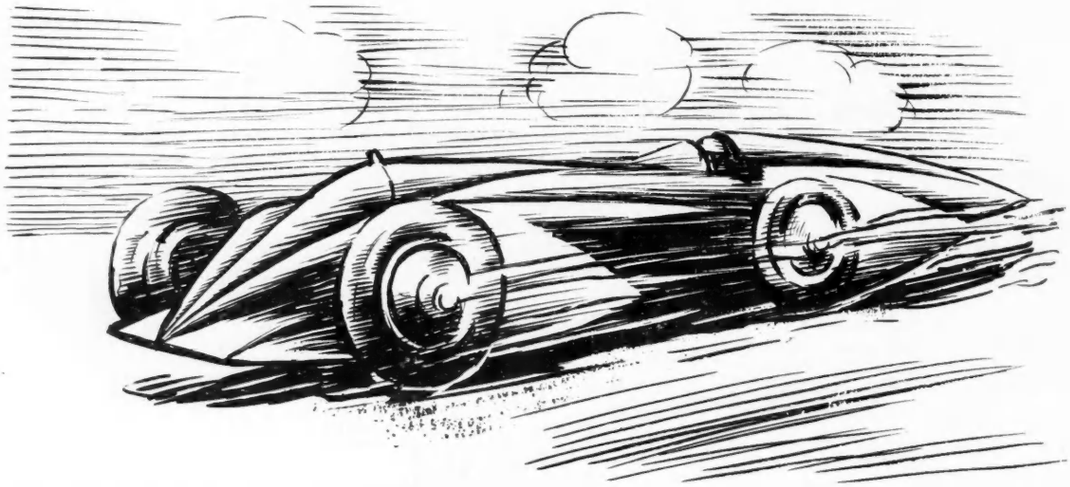
With the expansions that have been taking place production capacity is being rapidly stepped up to the point where demand can be more than met, and then from a sellers' market, such as the industry is experiencing today, we will find that a buyers' market has arisen. Very few of the manufacturers are equipped with any real sales organization and when the buyers' market comes these makers are going to begin to feel the pinch. It is probably due to the realization of this fact that competition has already reached a pitch where those back of the industry are organizing vertically and are lining up in definite camps where they bid promise of staging a war reminiscent of the early days of railroad history in this country.

Passenger Service Not Paying

Too much of this expansion is predicated on the growth of air passenger service. Statistics can be cited to bear out the contention of many men who are really well informed in the situation, that scheduled air passenger service has not yet proved financially successful and the opinion is advanced that it will be at least another 18 months before passenger service can be made to pay. Where this type of service is run in conjunction with air mail, express, and pleasure-riding, the service as a whole has been highly remunerative.



THIS picture of Segrave's "Golden Arrow" is a pen and ink sketch from an artist's impression which appeared recently in the British magazine Motor. It gives a good general idea of the appearance of the huge ultra-streamlined car with which Segrave hopes to establish a new speed record at Daytona Beach some time in February. Actual photographs of the car are not as yet available



Segrave Coming Jan. 30 for

Bringing 930-hp. "Golden Arrow" racer for trial at Daytona Beach in March. J. M. White, owner of car which holds present record, also will try to set new mark.

By M. W. Bourdon

MAJOR H. O. D. SEGRAVE has announced that he will leave England on Jan. 30 with his new car, "The Golden Arrow," to attack the world's speed record at Daytona Beach. The new car is equipped with a Napier-Lion 12-cylinder aircraft engine similar to the one used by Malcolm Campbell last year in his record attempts and to the one which powered the winning seaplane in the 1927 Schneider Cup Race. There are three rows of four cylinders arranged in fan shape or like a letter W, each cylinder having a bore of 5⅛ in. and a stroke of 5½ in. The valves are in the head and are operated by six overhead camshafts.

The engine, which is not supercharged, but operates with a compression ratio of 12 to 1, develops 930 hp. at 3400 r.p.m. Three carburetors are fitted and two 12-cylinder magnetos. The cooling water normally circulates through a header tank behind the engine and through an airplane-type corrugated-sheet radiator on each side. When the capacity limit of this cooling system is reached, a chemical cooling tank is connected in circuit by means of thermostatic valves.

The dry sump system of lubrication is used, oil being carried in two exposed side tanks, but there are no other means of cooling the lubricating oil.

Major H. O. D. Segrave

The engine has no flywheel, but the multiple disk clutch, of course, has a certain flywheel capacity. Owing to the high spring pressure required to hold the clutch in engagement, it is disengaged by means of a vacuum servo. The three-speed geared transmission has pressure lubrication. From the transmission the power is carried through spur gears to two parallel propeller shafts rotating in opposite directions. This arrangement neutralizes torque reactions and permits of placing the driver's seat at a lower level.

Final drive is by straight bevel

TO regain the crown which he once held as speed champion of the world, Major Segrave will have to drive his "Golden Arrow" a mile in each direction at Daytona Beach for an average of better than 207.55 m.p.h., the existing record held by Ray Keech.

Segrave made his first appearance in this country as a contender for the speed championship in March, 1927. His mount on that occasion was a 24-cylinder, 1000-hp. Sunbeam Special which, like the "Golden Arrow," was built in England. On March 29, 1927, he established a record of 203.97 m.p.h. This mark stood until the following February (1928), when Capt. Malcolm Campbell, another Britisher, came over with his 900-hp. "Bluebird" and averaged 206.95 m.p.h. Campbell, incidentally, used a Napier engine very similar to that in Segrave's present car.

Campbell's record was short-lived, as Keech, piloting the 1500-hp. "Triplex," owned by J. M. White of Philadelphia, took the track about a month later and set the mark which now stands.

Ray Keech

Barring accidents, Segrave is conceded a good chance of beating Keech's time, and thus carrying back to England again the crown which was his in 1927.

New Attempt at Speed Record

gears, no differential being used. The ratios are such as to give 246 m.p.h. at 3400 r.p.m. in top gear, 166 m.p.h. in second and 81 m.p.h. in low. Vacuum servo brakes are fitted. Steering is by a horizontal steering column, centrally located, through bevel gears and duplicated cam mechanisms, each of which latter is connected to one of the steering knuckles. There is no tie rod between knuckles. Directional control is assisted by two widely spaced sights and a black line along the center of the hood.

Half-elliptic springs are used, with flat ends which slide on slotted rollers. Pressed-steel radius rods and torque members take the driving thrust and the torque reaction of the driving axle, respectively. The deflection of both sets of springs is limited to 1 in. above and below the position of equilibrium, by means of rubber bumpers. Hartford shock absorbers are fitted.

The design of the gilded body shell is based on that of the fuselage of the seaplane which won the Schneider Cup Race. The body is 26 ft. long, inclusive of the tail, which has a large vertical stabilizing fin. The car weighs over 3 tons and has a frontal area of 12 sq. ft. Its maximum height is 45 in., while the wheelbase is 160 in. and the track 60 in. Quadruple-spoked wire wheels are used, with covering disks, and carry smooth tread 35 by 6 in. tires.

Major Segrave also takes with him a new motor boat with which he plans to compete for the world's championship in American waters in March next. This boat has the same type of engine as the racing car. Its hull is 28 ft. long but weighs only 640 lb. The propeller speed is 6500 r.p.m. In attacking the recently established American speed record of 92.8 m.p.h., Major Segrave expects to make a speed in excess of 100 m.p.h.

The racing car which Major Segrave brought to this country with him on his previous visit in 1927, when he established a record of 203.97 m.p.h., was a Sunbeam Special equipped with two 12-cylinder engines.

The following table shows how the Golden Arrow compares with the Sunbeam in major characteristics:

	Sunbeam	Golden Arrow
Total piston displacement	2760 cu. in.	1260 cu in.
Wheelbase	141 in.	160 in.
Weight	8000 lb.	6000 lb.
Brake horsepower	1000	930
No. of cyls.	24	12
Bore	4 13/16 in.	5⅛ in.
Stroke	5 5/16 in.	5½ in.
Tire size	36 x 6.75	35 x 6
Power-weight ratio	8.0	6.45

Segrave will sail from England on the Majestic which is due at New York on Feb. 5. He will be accompanied by William F. Sturm, American writer and racing promoter, who will act as his manager during the trials. Mr. Sturm sailed for England Jan. 11. The trials will be held between March 1 and 15 under a sanction which has been issued to the City of Daytona by the A.A.A. for that period.

J. M. White of Philadelphia, owner of the "Triplex," present title-holder, has announced that he too will have another fling at the record while Segrave is here. He states that he will have the car at Daytona ready to start by March 1 and that he is confident of establishing a new mark. The question of a driver has not been definitely settled, but Mr. White at present is considering driving it himself, he says.

AC Studies Aluminum

Ignition timing affects piston tem temperatures decelerate rise Combustion chamber con

By Ralph
Research Engineer,

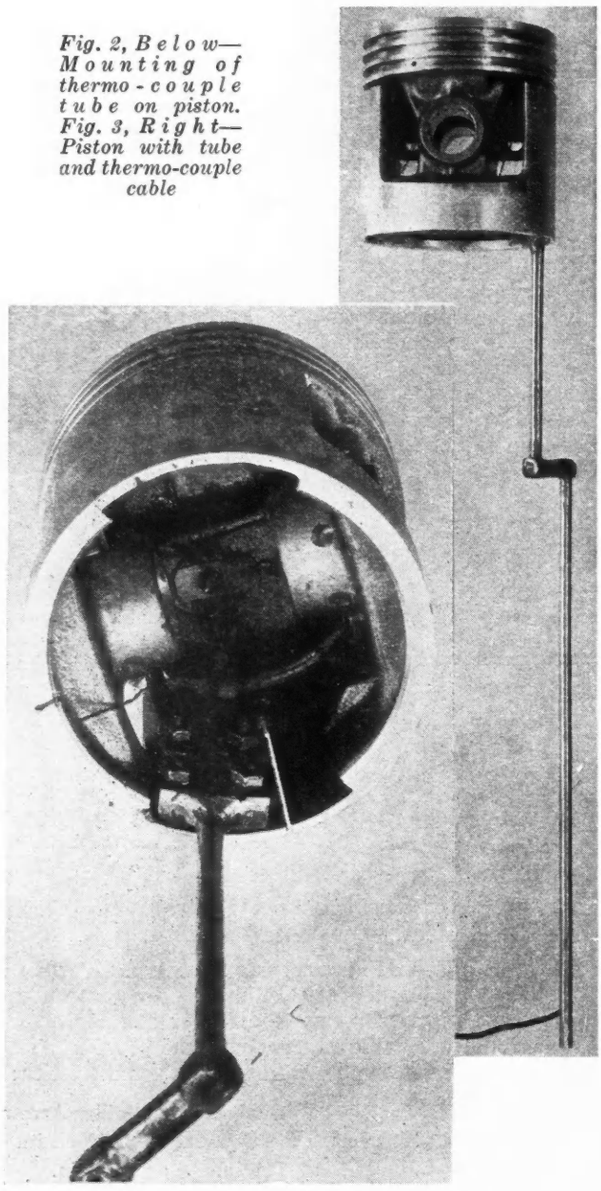


Fig. 2, Below—Mounting of thermo-couple tube on piston. Fig. 3, Right—Piston with tube and thermo-couple cable

IN connection with an investigation of the factors influencing preignition, a study of the operating temperatures of aluminum-alloy pistons was recently undertaken in the dynamometer laboratory of the AC Spark Plug Company.

In making the experiments described in this article, it was desired to find:

A—The maximum piston temperatures likely to be encountered in actual service with the particular type of engine and piston used in the investigation.

B—The effect of engine conditions upon these temperatures.

C—The temperature distribution throughout the piston, as far as practicable.

Because of the multiplicity of points at which the temperature was to be measured, the use of thermo-couples was decided upon. As a check upon the accuracy of this method, a series of alloys of known melting points were prepared, for use in a second piston at the most important positions.

The thermo-couples and incidental apparatus operated successfully at the comparatively high speed of 2200 r.p.m. and because of the simplicity and ease of operation of the set-up, it will be described in some detail.

Jardine and Jehle used thermo-couples for the measurement of piston temperatures in their work with a single-cylinder Liberty engine, described in the *S.A.E. Journal* for May, 1921. The couples, four in number, were led from the piston through a metal tube projecting through the crankcase and there connected to piano wire leads supported by a pantograph frame. This was found to be too heavy, breaking off the tube where it emerged from the crankcase. The tube was then given a bearing at its lower end and the piano wire leads stretched horizontally to a fixed point at some distance. This apparatus apparently functioned successfully at 1000 r.p.m.

A modification of this last arrangement, in which the couple leads were taken horizontally from the lower end of the tube along a rigid link to a fixed point, was used at the Bureau of Standards in 1923. The maximum speed reached in these tests, which were conducted on a Knight-type engine, was 1400 r.p.m.

The above-described linkage seemed the most promising and was selected for use in the present experiments. A piston was fitted with 11 copper-constantan thermo-couples in the positions shown in Fig. 1. No. 32 double cotton-covered wire was used. All couples were held in the piston by peening or by staking from an adjacent hole and were installed from the inside of the piston, 1/16 in. below the outer surface, which was not disturbed by drilling through. The wires were wound with silk and shallacked, forming a cable of 22 wires about ⅛ in. in diameter. A brass block, bolted to the skirt of the piston, supported a light tube of mild steel which was offset to avoid the crank-throw. (Figs. 2 and 3).

A rigid aluminum link 18-in. long, seen at the bottom of Fig. 4, served to lead the cable from the lower end of the tube to a fixed point. The link was slotted and held by a steel pin in the end of the tube, the slot allowing for the angularity of the link in its extreme positions. All the moving parts were designed for extreme lightness, since at 200 r.p.m. they were subject to inertia forces 234 times their mass in magnitude.

Each thermo-couple had a separate cold junction, a Leeds & Northrup potentiometer being used to measure the thermal e.m.f.

Figs. 5 and 6 show the arrangement of fusible alloy

Heat Effects on Alloy Pistons

peratures. High water jacket in piston temperature. ditions affect result.

N. DuBois
AC Spark Plug Co.

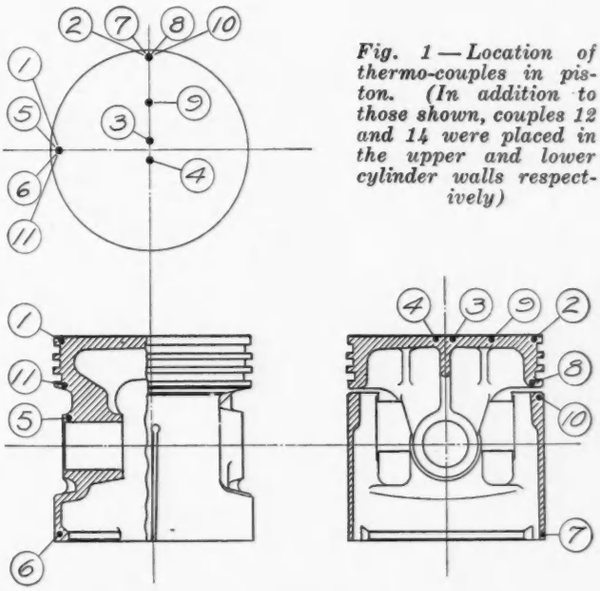


Fig. 1 — Location of thermo-couples in piston. (In addition to those shown, couples 12 and 14 were placed in the upper and lower cylinder walls respectively)

plugs in the second piston. Each plug was drilled in its center after being screwed into the piston, so that melting could be readily detected. The melting points range from 71 deg. to 420 deg. Centigrade by steps of approximately 40 deg.

In addition to those in the piston, thermo-couples were placed 1/16 in. below the surface of the cylinder wall at a point ½ in. above the top of the piston at upper dead center and at a point ½ in. below the top of the piston at lower dead center. The temperature of the carburetor air, jacket water outlet and crankcase oil were also measured.

The first runs were made with a jacket outlet temperature of 175 deg. Fahrenheit at full load. The carburetor was without manual adjustment and was used as received from the engine manufacturers. The piston temperatures at speeds from 600 to 2200 r.p.m. are shown in Fig. 7. The curves are numbered to correspond to the thermo-couple positions as shown in Fig. 1.

The spark advance was set for maximum power, but the range of advance became inadequate beyond 1600 r.p.m. and the runs up to 200 r.p.m. were made with maximum advance of 48 deg. The flattening of the piston-head temperature curves as the spark advance becomes inadequate for maximum power, is clearly

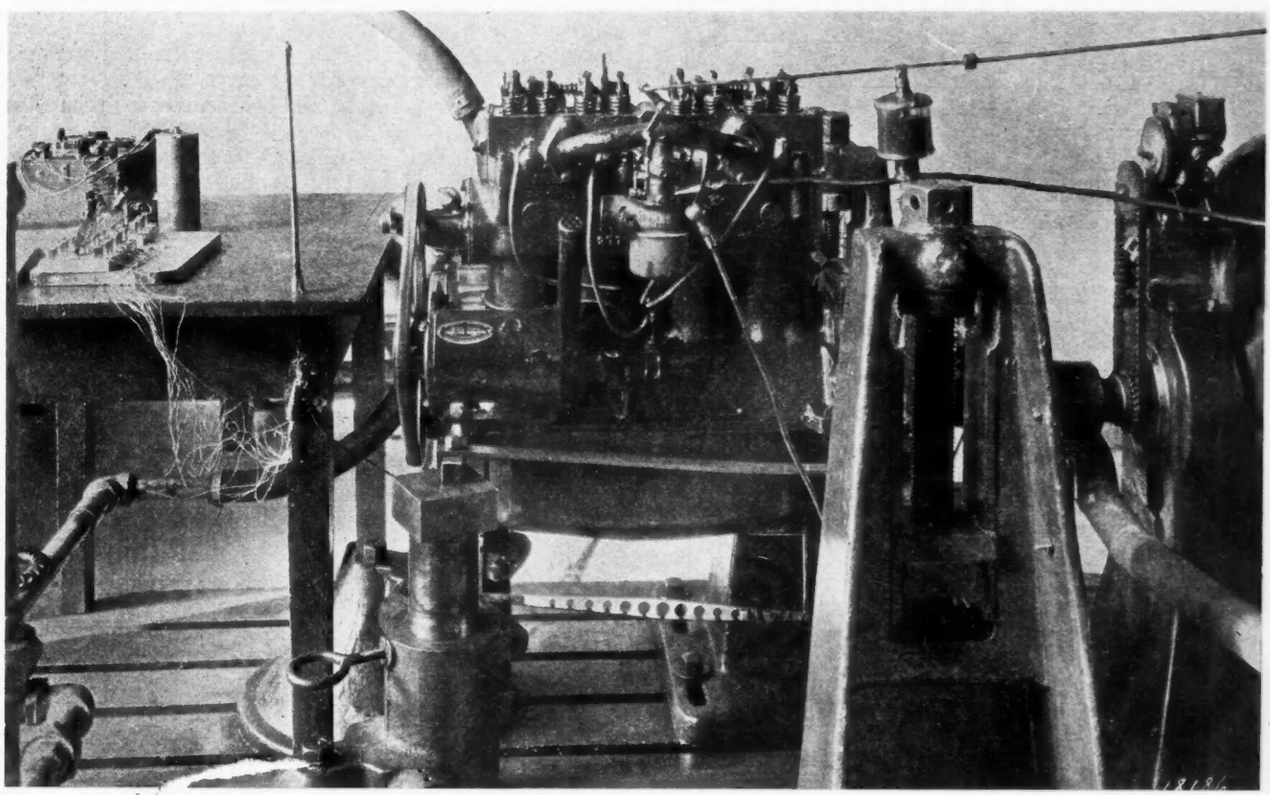
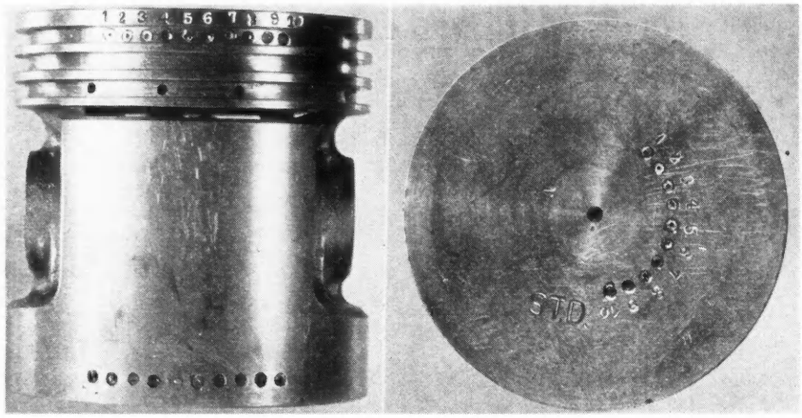


Fig. 4—Complete set-up. Oscillating link for conducting thermo-couple leads to a fixed point may be seen at bottom



Figs. 5 and 6—Fusible alloy plugs in piston No. 2. (Their melting points ranged from 71 to 420 deg. C.)

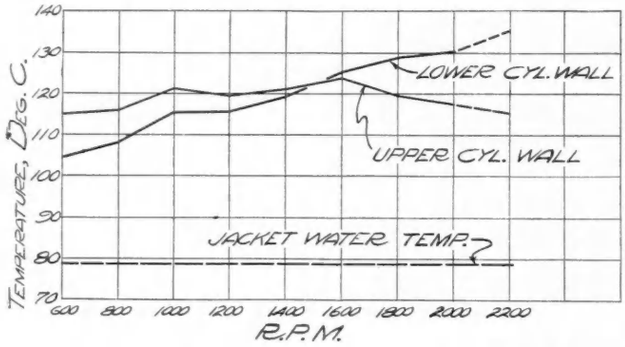


Fig. 8—Cylinder wall temperatures, showing influences of frictional heat and heat of combustion

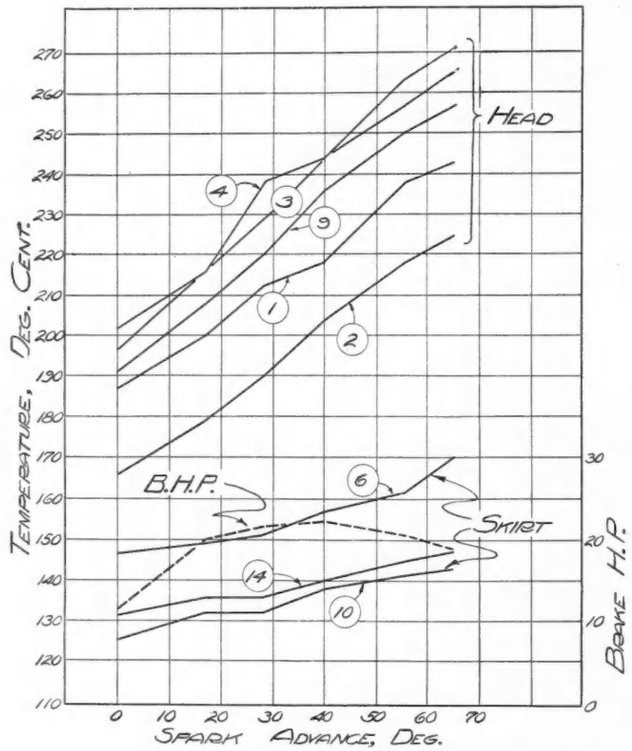


Fig. 9—Influence of spark timing. Full load at 1600 r.p.m. with maximum-power mixture and jacket outlet temperature at 175 deg. F.

shown. The sharp drop in temperature at 2200 r.p.m. is due to an accidental retarding of the spark to 20 deg. advance.

Fig. 8 shows the lower cylinder wall temperatures to increase uniformly with speed, which indicates the major influence of frictional heat at this point. The upper wall, being part of the combustion chamber surface, heats up slowly and then cools, as the spark advance is no longer sufficient for maximum power.

These results indicated a very marked influence of ignition timing upon the temperatures reached, and to investigate further a series of spark advance runs were made. To insure uniform mixture conditions, an adjustable carburetor was fitted and adjusted for maximum power for each run. With other engine conditions as before, runs were made at 1600 r.p.m. with spark settings from 0 to 65 deg. advance. Fig. 9 shows the increase of piston temperature with spark advance to be linear even at spark settings far beyond optimum advance. This, as is shown by the power of curve, was about 40 deg. As the compression ratio of the engine is only 4.3 to 1, it is not believed that detonation, induced by advancing the spark, was responsible for the temperature increase. This conclusion is borne out by the fact that the rate of increase is constant over the whole range of advance.

The influence of the jacket water temperature was next investigated. At 1600 r.p.m., full load, and maximum power mixture and spark advance, the jacket water temperature was varied over a range from 112 to 200 deg. Fahr. The corresponding piston temperatures are shown in Fig. 10. At the higher jacket temperatures, the rise in piston temperature becomes less marked. It is interesting to note, also, that the rate of increase is approximately uniform throughout the piston.

To determine, if possible, the relative influence of frictional heat and heat of combustion upon temperatures of the various parts of the piston, part load runs were made. At 2000 r.p.m. and 175 deg. Fahr. jacket

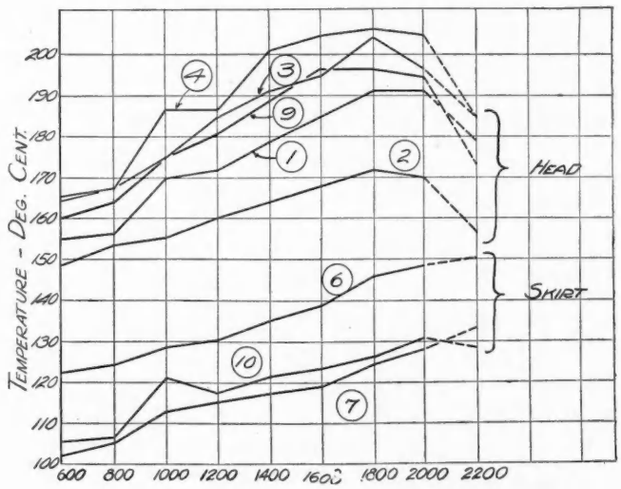


Fig. 7—Full-load runs. (Jacket outlet temperature 175 deg. F. Spark advance was inadequate for full power beyond 1600 r.p.m. and was retarded to 20 deg. at 2200 r.p.m.)

outlet temperature, the engine was run with no load, ¼ load, ½ load and full load. Fig. 11 shows the temperatures down the thrust side of the piston (see Fig. 1). As was expected, the temperature at point 2, at the top, increases uniformly with the increased combustion temperatures of higher loads. Point 8, just below the bottom ring, shows the same effect in less degree. Although separated from the head by a lateral cut, point 10 at the upper edge of the skirt tends to follow the combustion temperature changes. This is probably due to its contact, at the upper part of the stroke, with the combustion chamber wall whose temperature will, of course, vary with the load. The lower edge of the skirt, point 7, shows no such effect with increasing load and is apparently influenced chiefly by the frictional heat.

In considering the temperature gradients through the piston, those differences around the circumference which would tend to cause distortion due to unequal expansion are important. Fig. 12 shows some of the temperature differences at corresponding points 90 deg. apart on the circumference. The first piston used showed the head to be cooler above the piston pin than at a point 90 deg. from this position. The second piston, identical in design, showed just the opposite effect. On checking the cause of this discrepancy, it was noticed that couple 2 in the first piston was on the intake side of the engine, but in the second it was placed on the exhaust side. An examination of all the piston heads showed that there was a cool zone, apparently swept by the incoming charge, extending partly around the circumference and causing the exhaust side of the piston head to run considerably cooler than the intake side.

This incident illustrates the importance of taking into account the combustion chamber conditions when interpreting data of this sort. There is, however, a real temperature difference of some magnitude as shown by the figures for the land below the bottom ring groove and for the bottom of the skirt. These differences are due to the use of the pin bosses as the major channels for conducting heat away from the head.

The temperature gradients of Fig. 13 are typical of those obtained under all the test conditions and are self-explanatory. The influence of the rings in conducting heat from the head is indicated by the steep temperature gradient across the ring belt.

The fusible plugs, which were used in another piston in the same engine during the test, showed approximately the same maximum temperatures to have been

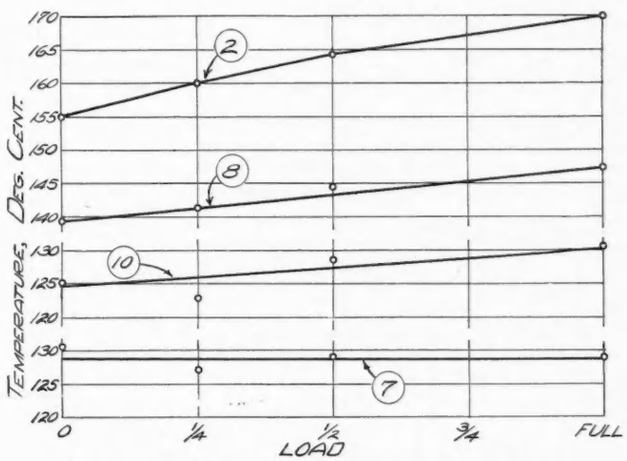


Fig. 11—Variations of temperature with load at constant speed (2000 r.p.m.) and a jacket outlet temperature of 175 deg. F.

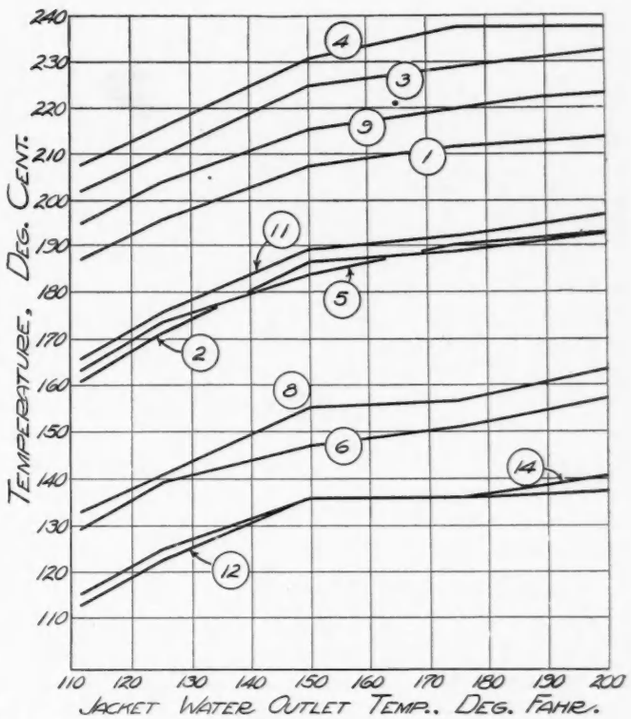
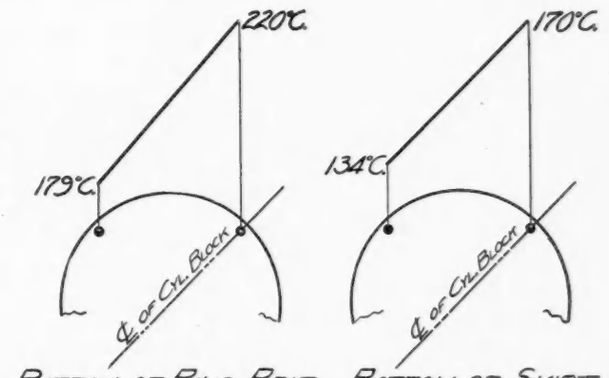


Fig. 10—Effect of jacket water temperature under full load at 1600 r.p.m. with maximum-power mixture and spark advance



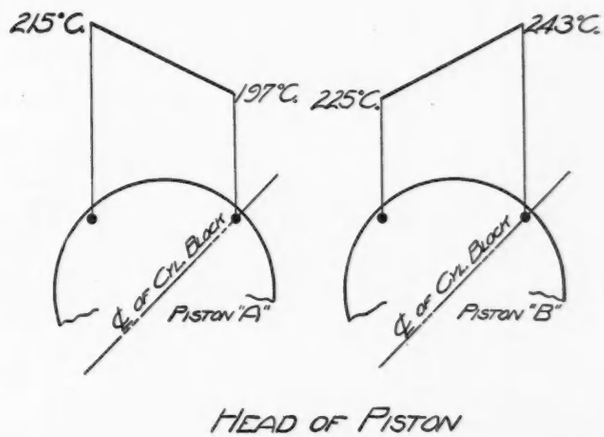


Fig. 12—Temperature differences between points 90 deg. apart on circumference of piston

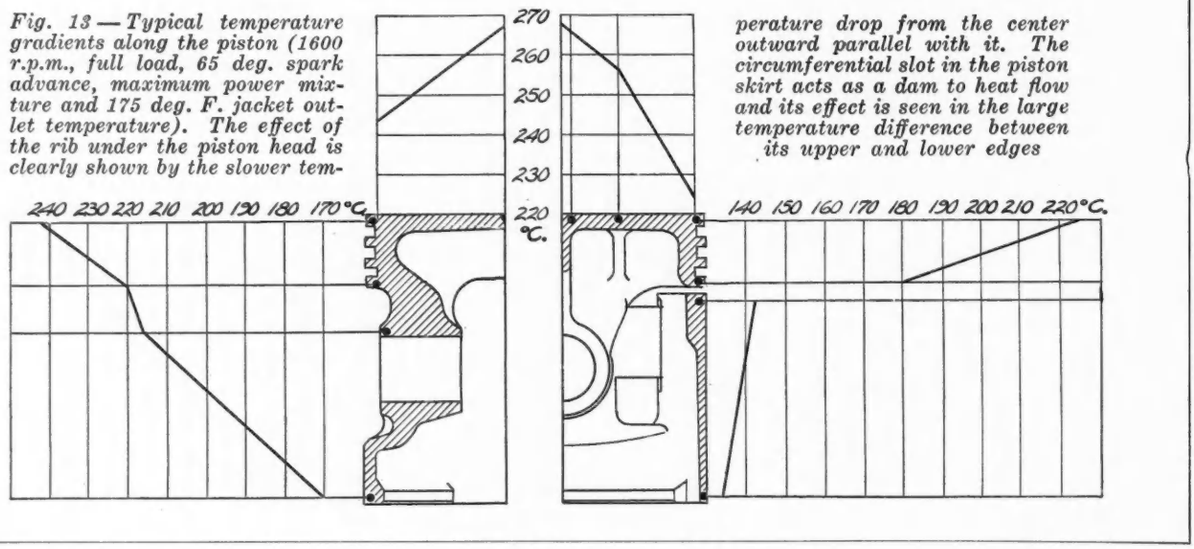


Fig. 13 — Typical temperature gradients along the piston (1600 r.p.m., full load, 65 deg. spark advance, maximum power mixture and 175 deg. F. jacket outlet temperature). The effect of the rib under the piston head is clearly shown by the slower temperature drop from the center outward parallel with it. The circumferential slot in the piston skirt acts as a dam to heat flow and its effect is seen in the large temperature difference between its upper and lower edges

reached as were indicated by the thermo-couples. The value of this method of indication is established where maximum temperatures at a few points only are desired.

While no attempt has been made in this article to go into the theory of heat transfer in explanation of the results here presented, it is hoped that the information may prove valuable to those interested in improving the performance and reliability of light alloy pistons.

Thermal Expansion of Magnesium

AN investigation on the linear thermal expansion of pure magnesium, magnesium-aluminum alloys and magnesium-aluminum-manganese alloys has been made at the Bureau of Standards and is dealt with in Research Paper No. 29, by Peter Hidnert, associate physicist and W. T. Sweeney, junior physicist, of the bureau. The coefficient of thermal expansion of pure magnesium has been determined a number of times, the first determination probably having been that of Fizeau, made in 1869. However, up to recently there were no available data on the coefficient of expansion of the alloys mentioned.

In the investigation referred to, expansion determinations were made between −183 deg. and +500 deg. C. Six samples of cast and extruded magnesium were examined over various temperature ranges, as well as 11 specimens of cast and extruded magnesium alloys. The maximum aluminum content of the magnesium-aluminum alloys was 10.4 per cent and the maximum aluminum and manganese contents of the magnesium-aluminum-manganese alloys were 4.1 and 0.9 per cent respectively. The average coefficients of expansion of the various materials as found in the tests are given in the following table:

Material	Magnesium content	Average coefficients of expansion per °C. 20° to 100° C.	20° to 200° C.	20° to 300° C.	20° to 400° C.	20° to 500° C.
	Per ct.	$\times 10^{-6}$	$\times 10^{-6}$	$\times 10^{-6}$	$\times 10^{-6}$	$\times 10^{-6}$
Magnesium	99.99	26.0	26.9	27.9	28.8	29.8
Magnesium-alloys	90 to 96	25.4 to 26.4	26.1 to 27.8	27.7 to 28.1	.....	.....
Magnesium-aluminum-manganese alloys	96 to 99	25.6 to 26.6	26.4 to 27.3	27.2 to 28.1	.....	.....

THE use of magnesium in alloyed form in motor car parts seems to be making considerable progress in Germany. Of the passenger cars listed in the Supplement to the German Automobile Manufacturers Association's Handbook, the Adler has magnesium pistons, crankcase and disk wheels, the Aga magnesium pistons, the Audi a magnesium crankcase, the Hanomag magnesium pistons, the Hansa-Lloyd a magnesium crankcase lower half, the Maybach a magnesium crankcase, and the Simpson Supra magnesium pistons.

THE German Automobile Manufacturers Association, which recently sold its exhibition hall to the city of Berlin, is reported to have set aside a sum of 500,000 marks of the sales price for the establishment of an automobile research institute. The directorate of the institute will consist of representatives of firms in the automobile, motorcycle and accessory fields.

THE Lancia Automobile Company of Italy is making preparations for the production of an eight-cylinder car which is to be marketed first by the American Lancia Corp., but is to be offered to European motorists also during the coming year.

Just Among Ourselves

Investors Interested in Coming Executives

THE big organization because of its very size almost of necessity has to give more attention to providing competent understudies for major executives than does the small company. The small company can do just as good and perhaps a better job along these lines, but on the average it doesn't seem to do so as regularly in the automotive field at least. As the general public becomes more and more interested in investment—as opposed to the speculative frenzy which still is current—it seems reasonable to suppose that the investors will begin to look beyond the well-known chief executives to attempt to gage the caliber and capabilities of their chief assistants. A detailed analysis of automotive companies from this standpoint would provide some interesting comparisons—although the opinion of the analyst would have to be allowed for, of course.

* * *

Patents Present Knotty Problems

FEW executives can hope to operate extensively in the automotive field without having to spend some of their time on patent matters, even though this extremely complex subject is full of terrors and irritations for the average business man of the manufacturing type. Despite the exchange of patents among vehicle manufacturers through the N.A.C.C. cross-licensing agreement, scores of able automotive executives, engineers and patent lawyers have spent thousands of hours prosecuting or defending or preparing to prosecute or defend patent claims of one kind or another. And many of the recent patent questions have involved millions of dollars one way or the other. Balloon tires, electrical systems, bumpers and wire wheels are just a few of the items involved in patent discussion of late. Only a small part of the effort devoted to patent matters gets to the surface; patents are today and always have been vital elements in automotive manufacturing procedure.

* * *

Beauty Sometimes Clashes With Utility

BEAUTY is desirable in automobile design, but if carried too far in certain parts it can be very annoying. We are thinking of a motorist who stopped a new car alongside of us the other day at a gasoline station. While an attendant was filling his tank he emerged from the car with a hammer in one hand and a small block of wood in the other. This caught our interest and we watched to see what he was going to do. He walked around to the front of his car, carefully adjusted the block of wood against a slight ridge on top of the otherwise perfectly flat radiator cap, and tapped the block with the hammer until the cap was loosened. He then removed the cap by unscrewing it, added some water to the radiator, replaced the cap, screwed it down as far as it would go by hand, and finally resorted again to the block and hammer to obtain the quarter turn that was necessary to bring the ridge of the cap into a straight fore-and-aft line with the car—the position for which it was designed. We wondered how many times the owner would repeat that operation without losing his temper.

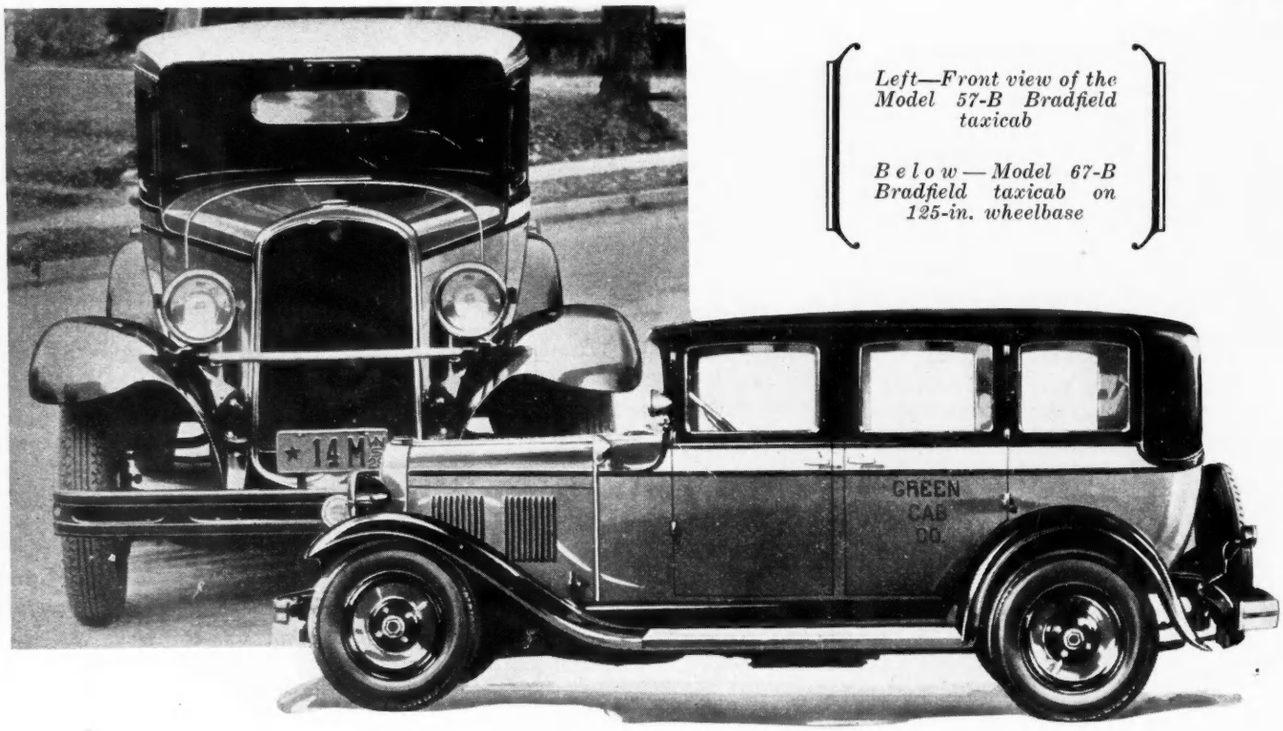
Witch Doctors Needed at Many Conferences

THERE are few disputes between capital and labor which could survive a discussion about the same table by employers and employees, both free from inferiority complexes and defense reactions," says C. E. A. Winslow, discussing mental hygiene in "Whither Mankind." And, we make free to add, there are few six-hour business conferences that would have to last more than one hour if those same inferiority complexes and defense reactions could somehow be exorcised from the meeting chambers. So far as we know, however, the witch doctor, capable of casting out those particular devils has yet to be discovered. We can be considered to have made some progress in the matter, however, if we get to the point of at least knowing that he is needed.

* * *

Many New Models are on the Way

DURING 1928 new model announcements of some kind kept coming along almost every month. The same thing is going to happen throughout 1929 unless we miss our guess. The new things already scheduled ahead are almost numerous enough to take care of most of the 12 months. The whole industry used to settle back after the New York show and stop worrying about what somebody else was going to bring out until after the spring selling season was over. But no more! The entirely new and striking chassis which will be shown publicly between now and July 1 will be greater in number than those at the New York exhibit.—N.G.S.



Left—Front view of the Model 57-B Bradfield taxicab

Below—Model 67-B Bradfield taxicab on 125-in. wheelbase

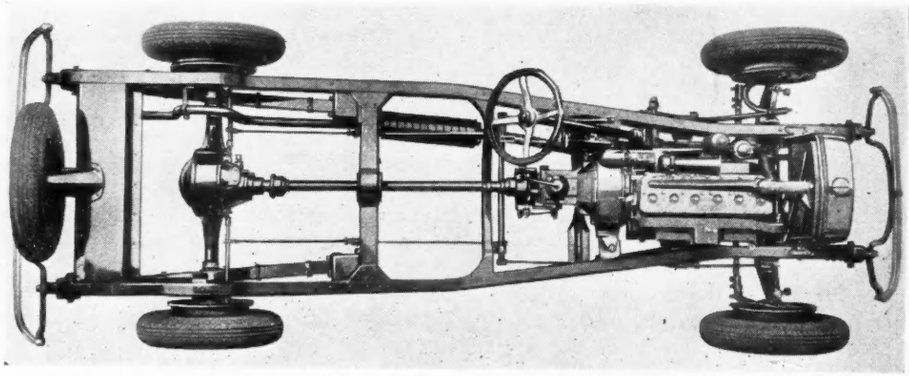
Bradfield Taxis Built on Modern Passenger Car Lines

Two new models seen for first time in east at New York show. Larger chassis has a 125-in. wheelbase and is powered by specially-designed six-cylinder engine.

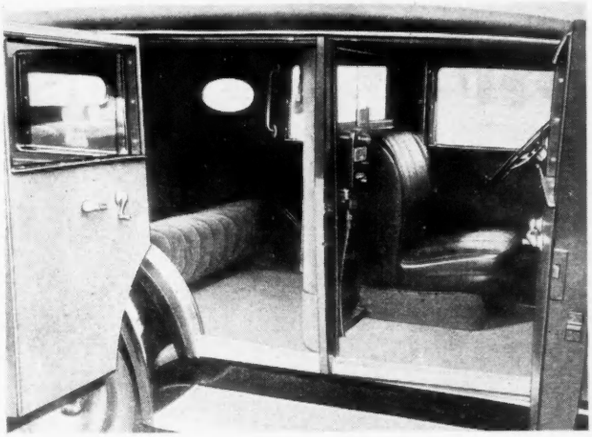
BRADFIELD MOTORS, INC., of Chicago, has placed on the market two taxicabs which were shown in the east for the first time at the New York automobile show. One of these has a wheelbase of 117 and the other of 125 in. While of substantial construction in accordance with taxicab requirements, the cabs follow modern passenger cars in their general lines.

The engine of the larger model, the 67-B, is a new six-cylinder design brought out specially for this taxicab. It has a bore of 3 5/16 and a stroke of 5⅛ in. and its chief features are said to be economy in operation and accessibility. The crankshaft has 2½-in. bearings, which is unusually large for a bore of only 3 5/16 in. Lynite pistons and Lynite connecting rods are employed. The bearing metal in the big end of the rods is spun in, to insure a perfect bond between the rod and the bearing metal. Pushrods are easily accessible for adjustment, and the complete assembly can be removed without disturbing the cylinder head or the Boyle poppet-type valves.

Lubrication is by pressure feed, and the entire oil supply is pumped through the oil filter before it enters the distributing leads. Water circulation is effected by means of a positively-driven, large-capacity centrifugal pump. Adjustment of the packing glands is by a large knurled nut which can be turned by hand. Repacking can be accomplished without removing the pump. The front drive is by a Link-Belt chain with automatic take-



Birdseye view of Bradfield taxicab chassis



Interior of Bradfield taxicab

up. The carburetor is a Model 210 Zenith, and the manifold of the Swan-patent type.

Generator, starter and ignition unit are of North-East manufacture, and ball bearings are employed wherever desirable. The clutch and transmission are of heavy-duty special taxicab design by Brown-Lipe. A spicer driveshaft is used and the Hotchkiss drive is employed. Both axles are of Timken make. The steering gear is a Ross heavy-duty taxicab type. Bendix internal brakes are used on all four wheels.

The frame is made of 20-25 point carbon steel, the side rails being 7-in. channel sections. To permit the turning of the cab in comparatively narrow streets the frame is narrowed at the front. Springs are semi-elliptic and made of alloy steel; rear springs, which are underslung, are 60 in. long by 2½ in. wide, while front springs are 40 in. long by 2¼ in. wide. Rubber shock insulators are standard equipment. Airplane-sweep-type, heavy-gage crowned fenders are used. The running boards are of heavy-gage steel. The muffler is a Powell built-up type and is cleanable. The road wheels are of Disteel make and are fitted with high-carbon steel brake drums. The fuel capacity is 17 gal. Chassis lubrication is by the Alemite system.

Body Custom-Built

The body is custom-built for taxicab service, of hard ash. It is low in appearance but has plenty of inside headroom. Pullman-type single-stanchion wide auxiliary seats, with the passengers facing forward, or drop type seats are optional. The hardware, which is of special taxicab design, is by Ternstedt.

The Model 57-B, with 117-in. wheelbase, is designed for use in the smaller cities where the daily mileage does not exceed 50 as a rule. Rubber shock insulators are standard equipment also on this medium-priced model.

This model also has a six-cylinder engine but the bore and stroke are smaller, 2⅞ by 4¾ in. Most of the items of equipment are the same as on the larger cab, but internal hydraulic brakes are fitted to all four wheels. Rear springs are 57 by 2 and front springs 38 by 2 in., all springs being of alloy steel. The body is custom-built for taxicab service.

The customer is given a choice of leather or mohair upholstery on both models and it is also left to him whether the body is to have three full windows or is to be of the rear-quarter semi-landau type with small oval windows.

Future Production Economies

(Continued from page 79)

dustry, but we know that if we can cut it further we are going to save money. Just how much it means in dollars and cents I don't know, and I don't believe anyone else does either. Some economists attempted to determine the cost of labor turnover per unit of manpower and they have offered actual figures for different industries. One large manufacturer is often quoted as saying that it takes him only six hours to train a man for his life's work. We don't believe it correct economics to operate that way and with the constitution of our manufacturing methods and wage payment systems (which are, after all, much alike in the automotive industry in general) any definite figure we would arrive at would mean but little except to show that the cost is higher every time we put a new man on a job.

"This is just a summary of what we are trying to do in the way of increasing production, reducing costs, etc., and one of the biggest things in the whole game is to make conditions so employees can earn higher wages and be contented, and still let the company enjoy the earnings commensurate with the capital invested."

New Diesel Engines

(Continued from page 83)

this moment injection of the fuel begins. Fuel and air then flow in opposite directions, and the high temperature of compression causes the ignition of the fuel. The air will carry some of the fuel along into the ignition chamber and combustion will take place there. This results in a reversal of the direction of flow and during the latter part of the injection period the fuel is carried directly into the combustion chamber and burns there.

This engine is built in a six-cylinder type with a bore of 5.12 and a stroke of 7.09 in. and is said to develop 90 hp. at 1200 r.p.m.

THE Sunbeam Motor Co. of England is preparing to enter the bus field with two chassis, one a six-wheeler for double-deck bodies seating up to 67 passengers and the other a four-wheeler for 37 seated single-deck buses or 26 seated saloon coaches. Both have six-cylinder overhead valve engines with pushrod operation of unorthodox character; the engine of the larger model has a bore and stroke of approximately 4¼ by 5½ in., giving it a piston displacement of 490 cu. in. The maximum power output is 142 b.hp. at 2500 r.p.m. The smaller chassis has an engine practically identical except that the bore is smaller, the piston displacement being approximately 400 cu. in. Dry sump lubrication is used and magneto ignition.

Both chassis have the driver's seat alongside the engine. Four speeds are provided and the worm-driven rear axles have a ratio of 7¼ to 1. Braking is through vacuum servo operation. The larger chassis has a wheelbase of 18 ft. 6 in. measured from the front axle to the center of the bogie axle.

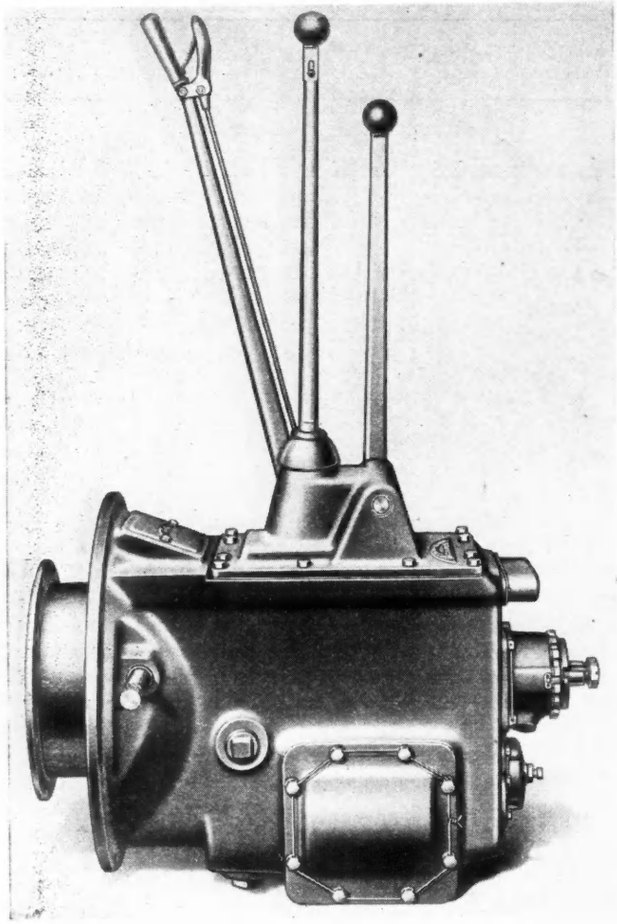
NEW DEVELOPMENTS—Automotive

Brown-Lipe Five-Speed Transmission

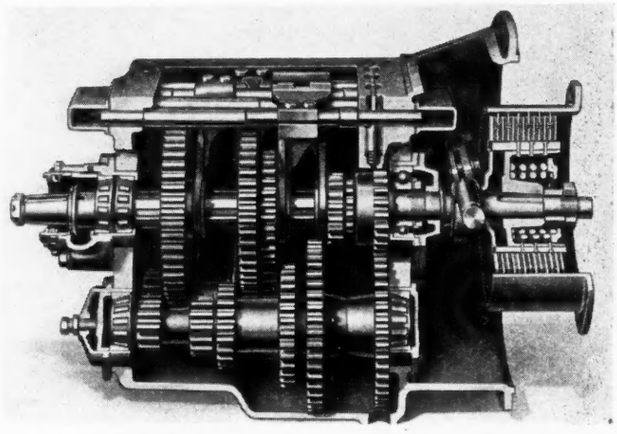
A NEW type of transmission made by the Brown-Lipe Gear Co. of Syracuse, N. Y., for trucks of 2½-3 tons capacity, is produced in three different models. All three models provide five forward speeds, but in two of them the fifth forward speed is an over-drive, one of these having two reverse speeds and the other one; the third model has a direct-drive fifth speed and two reverse speeds.

The design with over-drive in fifth and two reverse speeds, designated 959 XX, is intended for use on road-building trucks. The over-drive gives high speed when traveling without load, and the high-speed reverse, which is faster than second speed forward, enables the truck to back out of one-way stretches in about one-half the usual time.

For districts where road conditions are unsuited to the over-drive speed, the Model 975 XX is used, incorporating direct in fifth with four gradual step-ups and both low and high speed reverse gears. The third design, Model 986 XX, is adapted to fast express service, having over-drive in fifth speed and only one reverse.



The high speed reverse gear assembly is attached to the plate on the side of the case. A standard S.A.E. power take-off opening is provided on the other side



Four shifter bars are used in the control assembly of the Brown-Lipe five-speed transmission with two reverse speeds

A separate gear shift lever is used to engage the high speed reverse on the two models incorporating this feature. This lever shifts two integral gears on the reverse shaft into mesh with the second speed gears on the counter and main shafts. An interlock makes it impossible to shift either of the levers unless the other is in neutral.

Roller bearings are used on the countershaft and the rear of the mainshaft, the latter being a double bearing. The clutch shaft is mounted on a ball bearing.

Ratios of the various speeds of the three transmissions follow:

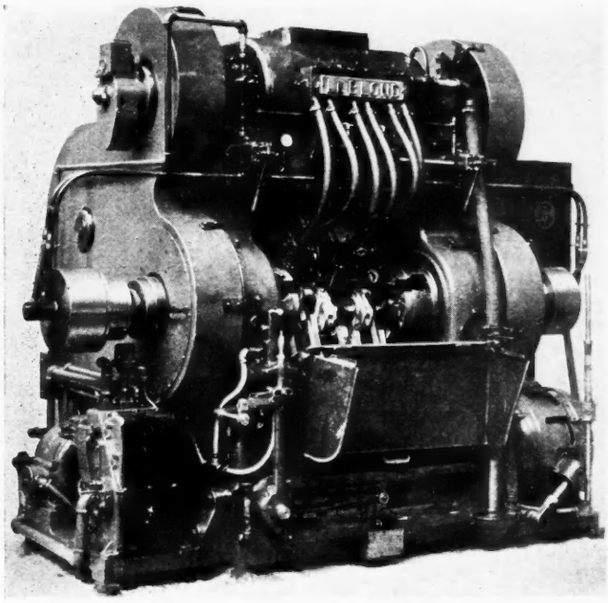
	Model 959 XX	Model 975 XX	Model 986 XX
High reverse	3.40 to 1	4.34 to 1	None
Low reverse	7.45 to 1	9.26 to 1	7.45 to 1
1st speed	5.96 to 1	7.41 to 1	5.96 to 1
2nd speed	4.00 to 1	4.97 to 1	3.72 to 1
3rd speed	1.80 to 1	3.08 to 1	1.80 to 1
4th speed	Direct	1.74 to 1	Direct
5th speed	.74 to 1	Direct	.74 to 1

LeBlond Crankshaft Lathe

A NEW crank pin turning lathe has been developed by the R. K. LeBlond Machine Tool Co., Cincinnati, Ohio, for simultaneously checking the webs and turning all pins to grinding size in one operation. The shafts are held in air-operated pot chucks; the tools are controlled hydraulically. They are set to the predetermined size of the pins and accurately hold sizes within the described grinding tolerance.

The driving and feed mechanism is synchronized and interlocked so that the hydraulic feed cannot be thrown in until the spindle is in motion. Neither can the spindle be put in motion until the crankshaft has been properly clamped. The crankshaft rotates about its center line bearings as an axis and the tools for checking and turning the pins follow the movement of the throws. The movement of the tools is controlled by two master crankshafts located above and below the crankshaft being turned. The master crankshafts and spindles are driven by large idler gears placed on each side of the machine. Master cranks and spindles rotate at the same speed.

Parts, Accessories and Production Tools



New LeBlond automatic crank pin turning lathe

The tool slides are arranged so that the tools feed into the work from opposite directions. The slides are coupled together by a segment gear driven by a long arm connected to a hydraulic cylinder mounted on the tool carrier. This cylinder controls the feeding and traversing of the tool. The oil is fed from the oil gear system to the feed cylinder by a heavy link arrangement of piping. The machine cannot be started if the air pressure falls below a safe minimum, and the traverse cannot be operated after the tools have started cutting.

The drive is by means of a direct connected 30 hp. alternating current motor. An electric dynamic brake is used to stop the spindle in any predetermined position. The lubrication is supplied by an automatic lubricator mounted on top of the machine. It is only necessary to keep the reservoir full of good oil in order to insure adequate lubrication of the slides and bearings of the machine.

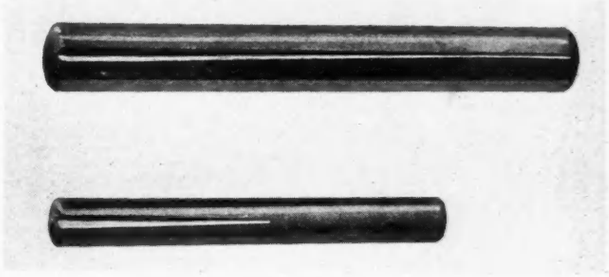
To operate the machine the crankshaft is slipped into both pot chucks, the steady rest caps raised, and both air valves opened. The driving motor control switch is pressed to the starting position, and when released it automatically drops back to the running position. The traverse lever can then be engaged. The tools traverse into the work, feed down to the proper depth of cut, traverse out to the starting position and the spindle stops automatically. The air valves can then be closed and the finished crank removed.

The production of this machine is limited only by the possibilities of the crank. The normal production generally averages between 20 and 30 finished crankshafts per hour.

Groov-Pin

A NEW type of taper pin, known as the Groov-Pin, which is said to have a number of applications in automotive and machine tool work, has been developed by Groov-Pin Corp., 45-22 Thirty-eighth Street, Long Island City, N. Y. The pins are formed out of cold drawn special steel alloy and, in automatic machinery, three gradually increasing longitudinal grooves are placed by dislodging the metal from its blank shape. These grooves are pressed into the pins by a 34-ton pressure and form three gradually tapering sectors which tend to close when driven into a drilled hole. These sectors press against the side of the hole, making a perfect self-locking contact through the elasticity inherent in the dislodged portions of the metal.

If necessary a Groov-Pin can be used over again by driving it out from the smaller end and turning it slightly when reinserting it in the same hole for the second time. Groov-Pins are manufactured to correspond in diameter to drill numbers from 68 to 2, to drill letters from A to Z and also to drill sizes based on fractions of an inch. Their length varies from ½ in. to 6 in. Special Groov-Pins to any other specifications can be supplied. All pins are made with a minus tolerance of half one-thousandth of an inch, thus insuring a perfect fit. All Groov-Pins are galvanized and can be made of brass, phosphor bronze, or especially hardened metal for use where exceptional stresses are to be met.

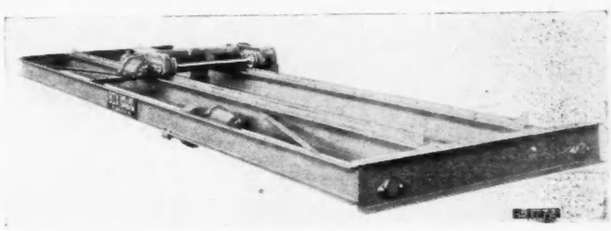


Some typical Groov-Pins

To use Groov-Pins a hole is drilled of the same diameter as the small end of the pin and the pin is then driven in, using a copper hammer.

Box Electric Traveling Crane

A NEW type of electric traveling crane known as the LHR type, has been developed by the Box Crane & Hoist Corp. of Philadelphia. This crane has been developed to give adequate crane service for buildings with a minimum height of 10 ft., and to effect savings in new building construction because of the small space requirement of the crane which permits storage to within 24 in. of the ceiling.

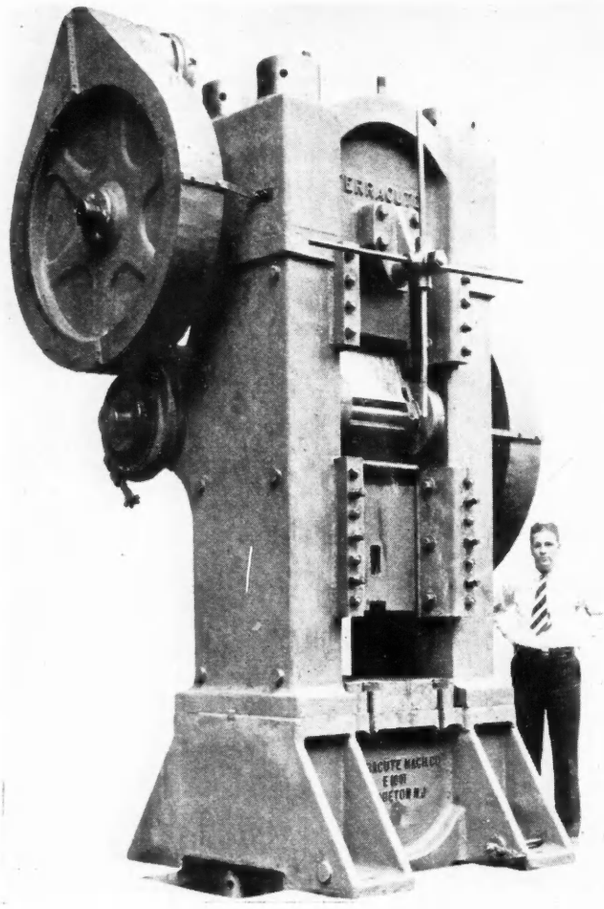


Box LHR electric traveling crane

The LHR crane is fully standardized from only one frame size for 1, 2 and 3 tons capacity and spans up to 50 ft. The crane is of all-steel, arc-welded construction.

Ferracute Coining Press

A 1000-ton coining press with a 2½-in. stroke and capable of making 30 strokes per minute, has been added to the line of presses built by the Ferracute Machine Co., Bridgeton, N. J. Four vertical steel rods shrunk into the columns take tensile stresses produced in the operation. Vertical adjustment of the ram is made by a horizontal wedge operated through a screw. The machine is fitted with a jaw clutch and a knock-out device for the ram. Toggles are steel castings, fitted with hardened and ground steel bushings and the steel toggle links are bronze-bushed and the steel toggle pins hardened and ground.



Ferracute 1000-ton coining press

The distance from right to left between the columns is 32 in., the depth of the bed from front to back is 36 in. The heights from the bed to the ram, at the top of the stroke is 20½ in., and the total weight of the machine is about 80,000 lb.

Brake Conduit Cable

THE American Cable Co., Bridgeport, Conn., has brought out a conduit cable control for automobile brakes. It is of the general type of the Bowden wire mechanism, a flexible cable extending through a flexible conduit whose terminals are clamped to the parts between which the motion is to be transmitted. The control is adapted for transmitting the braking motion to both front and rear wheel brakes. The cable consists of 51 wires and is 3/16 in. in diameter for use on passenger cars and ¼ in. for use on trucks and buses. The conduit also is made of wire and is so constructed that it can neither lengthen nor shorten appreciably. Terminals are applied to the conduit by the same Truloc swaging process by which the terminals are applied to Trulay brake cables. One desirable feature of this brake control is said to be that the loss due to friction between cable and conduit is only 10 per cent. Fatigue tests have been made of this brake control for both bending and wear and have shown it to meet all requirements in these respects.

Rawlings Window Regulator

THE American Chain Co., Inc., Bridgeport, Conn., which some time ago took over the Rawlings window regulator, has brought out a new design which was exhibited in New York at the time of the show. In order to open the window the operator pulls down on the glass by means of a metal clip fastened centrally at the top. The act of lowering the window automatically winds a coiled spring, but the window stays in any position to which it is moved. When it is desired to raise the window it is only necessary to loosen the friction lock by means of a small control lever, and the coiled spring of the control mechanism automatically performs the raising function. Thus the window can be controlled by one hand, and, besides, the operation of raising or lowering is very rapid.

High Production Set-Up

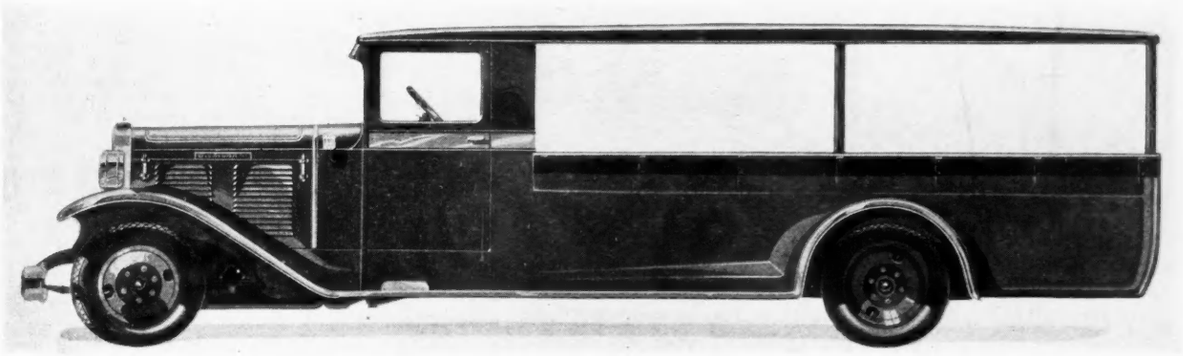
A RECENT machine tool set-up developed by a well-known automobile company produces 110 torque ball retainers per hour, using one man and two machines. The retainer is a malleable casting of 6½ in. outside diameter and is delivered to the Fay automatics, made by Jones & Lamson Machine Co., with the six holes drilled and the background.

It is located on an air-operated fixture, located by the bolt holes and held by three fingers. The back arm of the machine faces the outer flange and then rocks in to bring a rough profiling tool into position. The spherical radius is rough profiled and the carriage is then brought into position to rough and finish bore the small hole and finish profile the spherical radius. The carriage also carries a tool for chamfering the inside corner.

During finish boring of the profile the overhead slide finish faces the outer flange.

Vacuum Windshield Cleaner

A NEW vacuum windshield cleaner has been announced by Stewart-Warner Speedometer Corp., Chicago. The new cleaner comes in three types, an inside model with single hole mounting and inside control handle; an outside model with snow and rain shield, made to fit standard drillings and equipped with inside control handle, and a cleaner for windshields that raise and lower. This is also an outside mounted type and has dashboard control. All controls stop the wiper at the end of a stroke.



New six-cylinder Diamond T truck with express body

Diamond T Adds Two New Models

Both 1½ and 2½-ton trucks are equipped with heavy duty six-cylinder engines and a new series of stock bodies. Lacquer and chromium plating employed.

NEW 1½ and 2½-ton truck models equipped with heavy-duty six-cylinder engines and available with a new series of stock bodies of Diamond T design are announced by the Diamond T Motor Car Co. The new models give the firm a line of six-cylinder trucks ranging in capacity from 1 to 4 tons, in addition to which it supplies 5 and 7½-ton chassis optionally with six-cylinder powerplants.

In the design of the new trucks much attention has been paid to attractive appearance. The finish is in lacquer and such parts as headlights and cowl lights are chromium-plated over nickel.

The 2½-ton Model 550 has bevel gear drive. Its engine is a Hercules with 4-in. bore and 4½-in. stroke, which develops 74.5 hp. at 2400 r.p.m. The frame is pressed from heat-treated chrome-nickel steel. Channel section is 6½ in., with 3-in. flanges. Lockheed hydraulic four-wheel brakes are fitted and are operated through B. K. vacuum booster equipment, trunnion-mounted. Front brake drums are 16 in. in diameter and 2¼ in. wide; rear drums are 16 by 3½ in. The hand brake is a 14-in. ventilated disk on the driveshaft.

The clutch is the Diamond T multiple-disk type as used for many years. The transmission has four forward speeds and reverse. Main and counter shafts are ball-bearing-mounted. The propeller shaft design incorporates an intermediate bearing to prevent whipping. Three Spicer universal joints are employed. The rear axle is a semi-floating type, with spiral bevel gear drive, the driving pinion being straddle-mounted. Ratios are 6.37 to 1 and 7.12 to 1. A one-piece steel housing is used, and there are double Timken bearings in the hubs.

Springs are semi-elliptic front and rear, with additional six-leaf helper springs. Tires are 32 by 6 in. 10-ply pneumatic, with duals in the rear. Auto-Lite ignition, Alemite chassis lubrication, a copper fin and flat tube radiator, a Zenith 1¼-in. carburetor, and a cam-and-lever steering gear are other features of the design. The equipment includes an engine thermometer, heavy front fenders, air cleaner, speedometer, oil gage, chromium-plated radiator guard, battery, starter, bumper, horn, jack and tools. New stock bodies of Diamond T design include a low stake and a special furniture type.

Standard wheelbases are 155 and 165 in. The frame is 34 in. wide, and the track 64¾ in. Four other wheelbases, ranging from 128½ to 183¼ in., are available at extra cost, the smallest of these being for a tractor while the longest permits the use of a 14-15 ft. body. The stripped chassis weighs approximately 5400 lb.

The same construction is noted throughout the design of the 1½-ton Model 290, which is fitted with a 3⅜ by 4½-in. engine developing 54 hp. at 2400 r.p.m. Its speed limit is 35 to 40 m.p.h.

Hydraulic Internal Brakes

The taper frame is of pressed steel, with a depth of 6½ in. and 3 in. flanges. Other features include heavy-duty axles with Timken bearings, final drive by bevel gear with a ratio of 5.12 to 1, four-wheel Lockheed hydraulic internal brakes, Diamond T multiple disk clutch, semi-elliptic, alloy-steel springs, with five-leaf helper springs at the rear, four-speed and reverse transmission, cam-and-lever steering gear, Spicer all-metal universals, Budd steel disk wheels and either dual 30 by 5 pneumatic tires or 32 by 6 in. 10-ply single tires in the rear.

Wheelbases of 138½ and 156¼ in. are standard, and a longer wheelbase of 168 in. is optional at extra cost. The weight of the stripped chassis is approximately 4160 lb.

The new Model 151 one-ton chassis has a lengthened wheelbase of 132 in. which permits of mounting a body 8½ ft. in length. The entire chassis shows exceptionally rugged construction throughout. The engine is a new Diamond T six with 3⅜ by 4 in. bore and stroke, developing 61 hp. at 2900 r.p.m.

Chassis design parallels that of the 1½-ton Model 290, except for the fact that a three-speed transmission is used. Tires are 30 by 5 in. pneumatics all around, on spoked wheels.

First with the News

Reliable and Accurate

News of the Industry

VOLUME 60 PAGE 102 *Philadelphia, Saturday, January 19, 1929* NUMBER 3

Widespread Buying Follows Car Shows

Good Weather Conditions Important Factor in Developing High Volume

PHILADELPHIA, Jan. 19—Widespread buying has been noted in practically every section of the country during the first weeks of January, good weather conditions being an outstanding factor. Exhibits of new models at the annual New York show and in dealer salesrooms throughout the country have had the usual effect of quickening public interest in automobiles but buying is in larger volume than usual for the early year, the lower priced lines being especially favored.

Preliminary figures of December production indicate a total output in the United States and Canada of 250,000, an 83 per cent increase over production in December last year. The total for 1928 is thus brought to approximately 4,607,000, which exceeds the total of the former record year, 1926, by about 100,000. The increase over 1927 is approximately 1,027,000. In setting its new production record in 1928 the industry rose to record heights in its export sale, the increase in the domestic market being only 17 per cent over 1927.

Increases in schedules planned for the first-quarter are reported by several factories in response to demand for early deliveries and the increasing number of orders reported by dealers. The condition of shortage resulting from the closing-out of former models by a number of makers gives evidence of continuing through much of the first-quarter and practically makes certain the largest early year production volume the industry has experienced.

1928 Production of Rims Increases to 24,247,661

CHICAGO, Jan. 14—The total number of rims produced in 1928 was 24,247,661, as compared with 20,106,643 for 1927, according to the annual report of the Tire & Rim Association of America, Inc. Among balloon tire rims the size having the largest production was 21 by 2.75, 4,740,946 being the number produced, which was 19.6 per cent of the total.

Haynes is Named Durant President

NEW YORK, Jan. 17—Directors of Durant Motors, Inc., today elected Frederick J. Haynes, former president and chairman of the board of directors of Dodge Brothers, Inc., as president of Durant Motors, Inc., succeeding W. C. Durant. At the same meeting Ralph A. Vail, former director of engineering and production of Dodge Brothers, was elected vice-president in charge of engineering and production, and John A. Nichols, Jr., former vice-president in charge of sales of Dodge Brothers, and later president of Falcon Motor Corp., was made secretary and treasurer. R. T. Hodgkins was named general sales manager last week.

The new group took over management of the company immediately, bringing back under one fold the principals chosen originally by the late John F. and Horace E. Dodge as officers of Dodge Brothers. The revised board of directors includes W. C. Durant, F. J. Haynes, Roy D. Kerby, A. H. Henniger, R. A. Vail, John A. Nichols, Jr., R. T. Hodgkins and George Harrison Phelps.

The transferral of general headquarters to Lansing was confirmed.

Durant Schedules 3500

DETROIT, Jan. 14—Durant Motors, Inc., has production schedules of 3000 passenger cars and 500 trucks for January at its Lansing plants.

Willys Dealers Get 30 Tons of Air Mail

TOLEDO, Jan. 17—The largest shipment of air mail on record requiring 30 airplanes, will leave the Transcontinental Airport here today when Willys-Overland, Inc., dispatches several tons of letters to dealers and customers throughout the country describing its new Superior Whippet.

Smaller Export Car Needed, Says Mooney

DETROIT, Jan. 17—If motor car manufacturers are to invade the large field of low-priced prospects in foreign markets the industry needs an entirely new light car, it was stated in a paper prepared by J. D. Mooney, president of General Motors Export Co., and presented by Clarence N. Foss, engineer of the General Motors staff, at the annual meeting of the Society of Automotive Engineers held in Detroit.

By supplying a suitable product in a price class below that of the present American product, Mr. Mooney said, market potentialities two and one-quarter to two and one-half times those for the present product would be opened.

Col. William Guy Wall, retiring president of the society, in his annual address stated that motor car improvements to be expected are those designed to increase comfort and safety and reduce necessity for physical effort on the part of the operator. The meetings which opened Tuesday will conclude Friday night.

Schwab to Ease Duties, Retains Stutz Activity

NEW YORK, Jan. 17—Charles M. Schwab, chairman of the Bethlehem Steel Corp., has arranged to place his large stock holdings in the hands of trustees so that he may enjoy more leisure. He will continue, however, as chairman of Bethlehem Steel and also will retain his official connection with Stutz Motor Car Co. of America, Inc., and Chicago Pneumatic Tool Co.

M. & E.A. Outlines Activities for 1929

Expansion of Sales Development to Feature—To Broaden Credit Service

NEW YORK, Jan. 16—Executives and committeemen of the Motor & Equipment Association outlined an active program for the year of sales development, credit interchange and cooperation with other organizations in promotion of motor transportation and the automotive trade in a number of meetings held during the New York show.

Active membership work is to be carried on by a newly appointed committee of which H. D. Howard of the Massey Hardware Co., Wichita, Kan., is chairman, and B. W. Ruark, assistant managing director of the association, is secretary.

Sales development work will be expanded under the guidance of Neal G. Adair, as sales development manager, and this department has inaugurated work in sales research and sales promotion. Analyses of the aircraft, fleet owner and marine markets and studies of marketing methods will be carried out by this department.

Automotive Buyers Guides and Aircraft Buyers Guides will be published by this department and the monthly business bulletin of the Motor & Equipment Association will be broadened to include territorial sales information, in addition to the national bulletin now compiled.

This department will also continue the promotion of its course in automotive selling under the guidance of George Brosch, former Pacific field representative, who has been assigned to the direction of this course.

The credit department, under the direction of A. H. Fagan, will be broadened to include extensive exchange of information among the more than 500 manufacturers now enrolled.

Group conferences of credit executives and other phases of credit work will be continued and extended to meet this increasing activity.

The association has under way negotiations which it is hoped may lead to nationalization of the Save-A-Life campaign, or a similar movement, to bring about periodic inspections of motor vehicles as an agency of safety. To further this work a new committee on safety and traffic has been appointed, under the chairmanship of A. V. Hall of Sherwood-Hall Co., Grand Rapids, Mich. John J. Hall, former eastern field representative, will conduct campaigns in states which have not hitherto had a Safe-A-Life campaign and where public officials desire this cooperation.

Wright Licenses Thompson

CLEVELAND, Jan. 16—A franchise for the exclusive sale of Wright airplane engine parts in Cleveland and northern Ohio has been granted by the Wright Aeronautical Corp. of Paterson, N. J., to the Thompson Aeronautical Corp. By the terms of the franchise the Thompson company also becomes one of four concerns in the country authorized to repair and rebuild Wright engines under supervision of the Wright factory.

duPont Man Heads U.S. Rubber Company

NEW YORK, Jan. 16—With the election yesterday of F. B. Davis, Jr., as president and chairman of the board of the United States Rubber Co., control of that company by the duPont interests, which has long been foreshadowed, was indicated definitely. Mr. Davis, who succeeds Charles B. Segar as president of the rubber firm, is president of the duPont Viscoloid Co., a subsidiary of E. I. duPont de Nemours & Co., Inc.

While Mr. Segar's resignation was presented at yesterday's meeting of the board of directors, he will remain a director and member of the company's finance committee. The direction of United States Rubber by the duPont interests is expected to bring about an affiliation between that company and General Motors Corp., 25 per cent of the common stock of which is owned by the duPont company.

N.A.C.C. Handbook Out

NEW YORK, Jan. 16—The National Automobile Chamber of Commerce's official handbook of Automobiles for 1929 has appeared in a new form, increased in size to 6 by 9 in. The cardboard cover has been replaced with a green stock grained in the pattern of Morocco leather with lettering and embossed design in gold. Pages are printed with a tint border.

Murray Corp. Stock Added

NEW YORK, Jan. 16—Murray Corp. of America has approved an increase of authorized common stock from 900,000 to 1,000,000 shares, for future issue. The directors have provided for the use of available cash for expansion purposes rather than the retirement of funded debts.

Reeves to Visit Chicago

NEW YORK, Jan. 16—Alfred Reeves, general manager of the National Automobile Chamber of Commerce, will spend next week visiting plants in Detroit and Wisconsin before attending the Chicago automobile show.

Borg-Warner Earns $4,105,510

CHICAGO, Jan. 16—Earnings of the Borg-Warner Corp. for the 11 months ended Nov. 30, 1928, have been reported as $4,105,510, after deducting all charges including depreciation, Federal taxes and preferred dividends. This is equivalent to $10 a share on common.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for AUTOMOTIVE INDUSTRIES.

NEW YORK, Jan. 17—The larger industries have well maintained their new-year stride during the last week, but there has been no pronounced increase in business. Retail trade has been fairly good, despite the unseasonable weather and the influenza epidemic in many sections of the country.

DEPARTMENT STORE SALES

Sales of 397 department stores during December showed an increase of 1 per cent above those in the corresponding month a year ago, although December, 1928, had one less business day than the similar month in 1927.

COTTON CONSUMPTION

Cotton consumption in December totaled 593,907 bales, which compares with 592,539 bales in the preceding month and 679,453 bales in December, 1927.

FOREIGN TRADE

Exports of merchandise in 1928 were valued at $5,129,132,000, which exceeds any preceding year's total since 1920. Imports in 1928 were valued at $4,089,930,000, which compares with $4,184,742,000 in 1927. This decrease of $94,812,809 is chiefly the result of lower prices of some commodities in 1928.

FREIGHT CAR LOADINGS

Car loadings in 1928 totaled 51,576,731 cars, which marks a decrease of 59,075 cars, or 0.1 per cent under the total for 1927 and a decrease of 1,522,088 cars, or 2.9 per cent under the total for 1926.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended Jan. 12 was 97.1, which compares with 97 the week before and 97.2 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended Jan. 9 were 12 per cent above those in the similar week a year ago.

STOCK MARKET

The stock market last week was very irregular; and, while the tone was distinctly reactionary in the earlier part of the week, a fair degree of strength developed in the latter part.

FEDERAL RESERVE REPORT

The consolidated statement of the Federal Reserve banks for the week ended Jan. 9 showed decreases of $247,900,000 in discounted bills, of $7,300,000 in holdings of bills bought in the open market, of $4,700,000 in holdings of Government securities, and of $89,100,000 in member bank reserve deposits. The reserve ratio on that date was 66.3 per cent, which compares with 61.9 a week before.

Grant Says Chevrolet to Survey Taxes; Sees Need for Cooperation With Legislators

BOSTON, Jan. 13 — "Just where should the line be drawn between fair and unfair motor taxation?"

R. H. Grant, vice-president of Chevrolet Motor Co., asked that question today at the Copley Plaza. He was discussing the question with some friends previous to staging a rehearsal of the big meetings to be held here tomorrow in which about 1000 Chevrolet dealers will participate with factory officials.

"During my recent trip to England that problem was very much in evidence," Mr. Grant said. "There they have the horsepower tax running up to around $100 for even the smaller cars. And gasoline is higher than here. So it militates against motor buying, particularly the used cars.

"Our company has started now to procure a survey of motor legislation throughout the country to determine what the trend has been during the past 10 years. For example, a decade ago there started a wave of gasoline taxes throughout the nation with one state after another passing a law presumably to aid highway construction.

"It is generally agreed that a gas tax is a fair way to raise revenue. But when that is added to several others collected for the same purpose it seems a bit like going too far. In this home of the Boston Tea Party it is expected that legislation will not jeopardize an industry which means so much to the welfare of the community.

"Here you have a gasoline tax, its proceeds to go to highway maintenance that motor owners generally do not oppose. Then you have a registration fee, the proceeds going to road work. That registration law is based primarily upon identification, and some of my friends tell me that it should be a flat fee for all vehicles now that you have a gasoline tax.

"Then there is this new excise tax for the privilege of operating a motor vehicle upon the highways. Well, if the gasoline tax is for that purpose, with the registration fee proportionately so, and the excise tax is wholly so, it does seem as if three taxes for one purpose may be questioned.

"What we are going to try to learn throughout the country is whether or not cases like Massachusetts show a trend to burdensome levies.

"Perhaps we people in big manufacturing industries are too inquisitive but we are taught to cut down the costs to give the public the best possible article plus service at the lowest figure. Government is business on a big scale. Changing officials handicaps efficiency at times. We cannot help making comparisons.

"There must be an era coming when the automotive industry—not the makers and dealers, but all classes identified with it—should get together for organization like other groups. We have some organization now, but it is not what it should be. Then such bodies should have leaders who could discuss legislation with city, state and Federal officials. During the year a tentative program of needed legislation should be mapped out and gone over, if possible, with legislative leaders.

"Let us have legislation, yes, but not too much of it. Safe and sane legislation for the good of all is needed. We cannot do too much to cut down the accident toll, for example. Therefore, if we had these regional organizations combined with a national group all working for some specific aim like safety we could make greater progress in that direction."

Caterpillar Prices Down; Offers Model at $1,125

PEORIA, ILL., Jan. 12—Predictions of expansion of the Caterpillar Tractor Co. activities in this city which will establish the local factory as the center of tractor production in this country, coupled with formal announcement of price reductions, effective immediately upon all models ranging from $175 to $300, and announcement of three new machines, were made today at the annual sales convention of representatives of the company.

The new Model "10," already in production, was unveiled at this meeting; the "15," which will be on the market in a few months, and the surprise announcement of the new "35," a machine which will have four forward speeds and develop at least 35 hp. at the drawbar, were outstanding sales-interest announcements. The price cuts, attributed to inauguration of the straight-line production at the local plants are as follows: Sixty, $4,300, a reduction of $300; Thirty, $2,475, reduction of $175; Twenty, $1,975, reduction of $200; Two-ton, $1,500, reduction of $175, and the Ten, $1,125, the new model. These reductions are the fourth since Caterpillar succeeded the Holt and Best interests five years ago.

Smith Bearings Appoints Ashton Sales Manager

CHICAGO, Jan. 14—L. C. Smith Bearings Co., which on Jan. 2 moved from 2120 Michigan Ave. to its new factory at 2633 Michigan Ave., has announced the appointment of E. J. (Cap) Ashton as its general sales and service manager, a position created by the company's newly-launched expansion program. Mr. Ashton has been in the automotive industry for 20 years, founding the Ashton-Deveer Co., of Boston, serving as sales promotion man for the Biflex Corp., and more recently as zone manager for the Automotive Equipment Association.

The new L. C. Smith factory is a two-story structure, 58 ft. wide and 163½ ft. long. In moving a stock of more than 25,000 items not a business day was lost and orders were filled without interruption. Three branches of the company will be maintained in Chicago, according to L. C. Smith, president.

Studebaker Schedules High January Output

SOUTH BEND, Jan. 14—The largest January production in the history of the Studebaker Corp. of America has been scheduled as a result of the reception accorded the new Studebaker models at the New York show, according to an announcement by A. R. Erskine, president.

Changes made in the South Bend plants have provided many thousands of square feet of additional space available for the increased manufacturing schedule.

The past year was one of the most successful in Studebaker history, with sales of 136,000 cars. This compares with 111,000 cars in 1926 and 116,000 cars in 1927. Export business in 1928 was the greatest in Studebaker history. By September of 1928 export sales had passed the total sales volume of 1927, which was the best previous year in overseas markets.

Newton Steel and Fisher Buy Monroe Properties

DETROIT, Jan. 12—Lawrence P. Fisher has purchased 1300 acres of marsh land south of Monroe, Mich., paying $260,000 for the property. The Newton steel interests of Youngstown, Ohio, have closed options for 850 acres adjoining the Fisher tract and a great steel development, involving expenditure of $30,000,000, which will include a $10,000,000 sheet mill and harbor and channel improvements, has been planned for the immediate future.

Pontiac Schedule 700 Daily

PONTIAC, Jan. 15—Final sales figures for December, 5175 cars, reported by Oakland Motor Car Co., bring total Oakland-Pontiac sales for 1928 to a new high record of 260,246 cars. This total is 67,280 greater than during the preceding year when 192,966 were sold. The new Pontiac production is under way and it is expected that within a short time the production of this new model will be brought up to 700 cars per day, with even greater production promised for February.

Hinkley Joins Buda

HARVEY, ILL., Jan. 14—C. C. Hinkley, of Detroit, has been appointed executive engineer of the Buda Co., succeeding J. P. Mahoney, who resigned recently.

Show Satisfactory, Attendance Lower

Prevalence of "Flu," Hotel Exhibits, Earlier Announcements, Seen Factors

NEW YORK, Jan. 14—While actual figures on attendance at the automobile show last week have not yet been compiled, it seems probable that total attendance is perhaps a little below the attendance of last year. Several facts are assumed to have contributed to this condition, probably the first being the prevalence of influenza in and around New York during the time of the show. Other factors considered are the independent exhibits held in hotels at the same time as the show and the fact that many of the lines had already been shown during the two months previous to this show.

In spite, however, of the possible lower attendance this show was considered by most manufacturers as the most satisfactory ever held. One manufacturer characterized it as the best selling show in the history of the industry. Another manufacturer reported that contracts had been signed during the show for more than 8000 cars.

One of the aspects contributing to the success of the show was the changed arrangement of the cars and the spreading of cars to three floors, thus allowing more room for crowds to circulate among them and to examine them in a more leisurely manner. The stairway leading from the first to the second floor was regarded as highly successful by all manufacturers. Contrary to a fear expressed beforehand that the stairway by taking visitors to the second floor would keep them from going to the third and fourth floors, as those using the elevators must do, it was found that more visitors went to the third and fourth floors this year than ever before.

S. A. Miles, show manager, in reviewing this show, stated that the public seemed to favor conservatism in colors in the purchases made at the show this year. He also indicated that manufacturers saw no reason to curtail early estimates of production schedules this year as a result of the show.

Commenting on the fact that foreign exhibitors were present this year for the first time in a number of years, Mr. Miles remarked that an increase in foreign displays at the show would be welcomed.

It was also pointed out that this year no one car dominated this show as has so frequently been the case in the past.

Atlas-Ansonia in New Plant

NEW HAVEN, Jan. 12—The Atlas-Ansonia Co., which was formed recently through the merger of the Atlas Mfg. Co. of New Haven and the Ansonia Novelty Co. of Ansonia, Conn., is now occupying its new plant here.

G. M. Truck '28 Sales Expand by $9,500,000

DETROIT, Jan. 12—According to Paul W. Seiler, president, the General Motors Truck Corp. during 1928 has increased its domestic truck sales approximately $9,500,000 over 1927 and the dealer organization approximately 163 per cent over the same period. During the past year the plant has produced 30,572 automotive units, truck, coach and bus. The peak employment was 4027 and the payroll approximately $6,000,000 during 1928. The total number of trucks built in the Pontiac plants of the General Motors Truck Corp. during 1928 were 27,379.

House is Appointed Republic Truck Head

DETROIT, Jan. 12—Thomas H. House, formerly sales manager of the Republic Motor Truck Co., Alma, Mich., Thursday was named to succeed the late Oliver H. Hayes in charge of all Alma operations of the company. He will act as assistant to G. L. Hanks, chairman of the executive committee of the company.

Mr. House is well known in automotive circles. In 1920 he was associated with the Republic company in Alma, and later with the Ruggles company. For the last year and a half he has been northwest zone sales manager for the Republic Sales Corporation, at Portland, Ore.

Lempco Adds $100,000 Unit

BEDFORD, OHIO, Jan. 14—The Lake Erie Metal Products Co., manufacturer of Lempco products, broke ground Jan. 7 for a two-story addition to its factory which will increase floor space of the present building by 33 per cent. The new building, the third addition to the factory within two years, was made necessary by greatly increased demand for Lempco products for the replacement field and a number of original equipment contracts with truck chassis builders. Cost of the new structure and additional equipment will be approximately $100,000.

Federal Truck Builds

DETROIT, Jan. 14—Federal Motor Truck Co. has let contracts and ground has been broken for an addition, 400 ft. long, to its factory here. The building will add 57,600 sq. ft. of floor space to the company's facilities and will be used in expansion of the final assembly, enameling and body departments. Additional space also will be permitted for the export shipping department.

Four Vehicle Types to Motorize Infantry

Will Use Light Cars and Two and Four-Wheel Drive Trucks

WASHINGTON, Jan. 17—Purchase of a number of light cross-country cars and three types of trucks will be necessary to complete the motorization of the Thirty-fourth Infantry, Fort Eustis, Va., in accordance with plans of the War Department, it was officially announced.

The Thirty-fourth will be the first completely motorized infantry regiment and the motorization must be completed by June 30, 1929, under orders of the department.

In addition to equipment now issued and that to be issued from stocks on hand, the department will be compelled to purchase a number of light cross-country cars, three-quarter-ton trucks of a four-wheel type with a two-wheel drive, and six-wheel type with a four-wheel drive, and one and one-half-ton trucks with a four-wheel drive, it was announced.

McQuay-Norris Business Shows 57 Per Cent Gain

ST. LOUIS, Jan. 12—McQuay-Norris Mfg. Co. has announced an increase in business in 1928 over 1927 of 57 per cent with each month showing an increase over the corresponding month of the previous year, and with an even gain in all lines of piston rings, pistons, pins, bearings, bolts and bushings. During the year all the company plants have been working double and some triple shifts.

Extra shifts were maintained even through the slower periods of November and December in order to replenish stocks depleted by the year's business. The line of McQuay-Norris bolts and bushings for steel knuckles, tierods and spring shackles, announced last August, is included in the company's present stock.

Rich Tool to be Division

DETROIT, Jan. 14—Carl H. L. Flintermann, president of the Wilcox-Rich Corp., has announced that the Rich Tool Co. will be operated as the Rich Tool Division of the Wilcox-Rich Corp., as a result of the consolidation of the two companies. The new division, which is combined with the other three divisions of the company, will maintain the same personnel.

Submits Chromium Report

WASHINGTON, Jan. 17—Tests conducted by the U. S. Bureau of Standards have revealed that chromium is more permanent than nickel and is particularly suited for use on automobile radiators and headlights, according to the bureau's report of the investigation.

Men of the Industry and What They Are Doing

Spicer Reelected Head of Asbestos Association

The Asbestos Brake Lining Association at its annual meeting held in New York, recently, elected the following officers for the coming year: J. T. Spicer, Johns-Manville Co., president; H. W. Kelsey, Russell Mfg. Co., first vice-president; William Brookes, Ferodo & Asbestos Co., second vice-president.

The code of ethics, on which the association has been working for many months and which sets forth policies to which all its members have subscribed for their dealings with one another and the general public, was adopted. The committee which has been working on clutch facings made its report and this report is now made available for the entire trade.

Potter Leaves Deere

Miles S. Potter, general superintendent and purchasing agent of the John Deere Tractor Co., Waterloo, Iowa, has resigned, effective Feb. 1, to become general manager of the heating division of the Modine Mfg. Co., Racine, manufacturer of automobile radiators and unit heating systems. Joseph L. Cramer, who has been purchasing agent at the John Deere Harvester Works, East Moline, Ill., will succeed Mr. Potter in the Waterloo plant. Mr. Potter has been associated with the Deere organization since 1918. The newly appointed purchasing agent has been with the company 15 years.

Disher Joins Edelmann

G. F. Disher, who for the past 25 years was president and general manager of the Gemco Mfg. Co. of Milwaukee, has become vice-president of E. Edelmann & Co. of Chicago. Mr. Disher has been president of the Automotive Manufacturers Association of Chicago for two years, as well as an active member of the Motor & Accessory Manufacturers Association and the Automotive Equipment Association.

Gorman Succeeds Trabold

J. R. Gorman has been elected president of Transue & Williams Steel Forging Corp., succeeding F. W. Trabold, who resigned recently, and has been made a director and member of the executive committee. M. C. Semour has been made secretary and treasurer to succeed Herbert Wolfe, resigned.

Ferry on Bond Board

At the annual stockholders' meeting of The Detroit Co., the national bond distributing organization of Detroit & Security Trust Co., Hugh J. Ferry, treasurer of the Packard Motor Car Co., was added to the board of directors.

Soviet Banker Here on Factory Mission

Aaron L. Scheinmann, chairman of the board of directors of the state bank of the Union of Socialistic Soviet Republics, is now in this country with a view to instigating negotiations with American interests for the construction of a large automobile manufacturing plant in Russia. Although Mr. Scheinmann has not identified the interests with which he is at present negotiating, it is intimated that he plans to approach officials of the Ford Motor Co. and of General Motors Corp. with a view to interesting them in this enterprise.

Paton Joins Perfect Circle

Perfect Circle Co., Hagerstown, Ind., has appointed Roy Paton to the engineering staff as experimental engineer. Mr. Paton, who is a graduate of the University of Michigan, was formerly affiliated with the Chrysler Corp. in charge of cold room testing. At Perfect Circle, Mr. Paton will be in charge of the experimental piston ring testing laboratory.

Willys to Aid Convicts

John N. Willys, president of Willys-Overland, Inc., and Marshall Field have accepted invitations to become directors of the Marshall Stillman Movement, which recently took over a factory for the purpose of employing ex-convicts. The movement also operates service clubs.

Erskine on Marine Trust Board

A. R. Erskine, president of the Studebaker Corp. of America and chairman of the board of directors of the Pierce-Arrow Motor Car Co., has been named a director of the Marine Trust Co. of Buffalo.

Robins on Export Trip

Harry M. Robins, president of the H. M. Robins Co., Detroit, export factor, sailed from New York Jan. 5 for Naples. He will spend some time in Italy, later visiting several other countries on the Continent and the British Isles, calling on the distributors.

Houston Succeeds Bitting

Clarence P. Bitting, of Detroit, has resigned as a director of the Baldwin Locomotive Works and has been succeeded by George H. Houston, of New York, who will represent the Fisher interests with Fred Fisher.

Dunwoody Named Officer of Universal Aviation

Col. Halsey Dunwoody, who resigned as assistant to President Russell E. Gardner, Jr., of the Gardner Motor Co., will become executive vice-president of the Universal Aviation Corp., a $7,000,000 concern operating air mail and passenger lines in northern and mid-western states. Colonel Dunwoody was selected for the position of executive vice-president because of his experience as chief of supplies for the army air service in France during the World War. Russell Gardner, Jr., is a director of the Universal Corp.

Eddins on Bank Board

The City National Bank of Lansing has elected D. S. Eddins, vice-president and general sales manager of the Olds Motor Works, to the board of directors. Other directors elected include Ernest I. Dail, Dail Steel Product Co.; R. E. Olds, Reo Motor Car Co.; Drury L. Porter, Motor Wheel Corp.; Ray Potter, Michigan Screw Co., and I. J. Reuter, president, Olds Motor Works.

Pilot Gets Aviation Post

Arthur Sowdon, formerly engineering officer at Miller Field, Staten Island, N. Y., has been appointed director of aviation sales for the Detroit Steel Products Co., with headquarters in Detroit. The company manufactures airplane hangar doors.

LeBlanc Joins Robert Bosch

A. T. LeBlanc has joined the aircraft division, manufacturers' sales department, of the Robert Bosch Magneto Co., Inc. Mr. LeBlanc was sales manager of the Eisemann Magneto Corp. for many years and until recently has been the manager of the Philadelphia branch of the Hahn Motor Truck Corp.

Keller Adds to Duties

K. T. Keller, vice-president of the Chrysler Corp., has been given additional duties, having been appointed recently as general manager of the Dodge Brothers division of the company.

Vavon Introduces Citroen

M. Vavon, chief engineer of Etablissements Andre Citroen, arrived in New York on the Isle de France last week, bringing with him one of the new six-cylinder Citroen cars.

Servel Appoints Collins

W. S. Collins, who has been acting chief engineer for Servel, Inc., Evansville, Ind., has been appointed chief engineer. He was formerly associated with the Premier, Stutz, Gardner and H.C.S. as assistant chief engineer.

Nash Motors Earns $20,820,085 in Year

Income is Equivalent to $7.62 a Share—1927 Earnings $22,670,744

NEW YORK, Jan. 12—Nash Motors Co. reports net income for the fiscal year ended Nov. 30, 1928, as $20,820,085 after all charges. This is equivalent to $7.62 a share on the stock and compares with income of $22,670,744, or $8.30 a share, in the preceding year. Directors authorized the regular quarterly dividend of $1.50 a share as against previous declaration of $1 regular dividend and 50 cents extra dividend quarterly. Thus stock has been placed on a regular $6 a year basis.

"The number of units produced and sold was the largest in the company's history," said C. W. Nash, president, in reporting on the fiscal year. "The balance sheet shows accounts payable of $2,890,100, which constitutes our only indebtedness except reserve for taxes. The company closed its year's operations with a balance of $41,244,734 cash on hand, in banks and Government securities, and it is in a splendid financial position to meet any requirements of business.

In completely redesigning our cars there were unusually heavy expenses of upward of $2,000,000, all of which was absorbed in the year's operations. At the close of the year the company had on hand in material and supplies, at cost or market—whichever was lower—an inventory at all three plants of $5,809,040.

"During the year there was added to permanent buildings, machinery and equipment, excluding the Seaman Body plant, about $725,000. At the Racine plant there are additions under construction now that cost more than $300,000. These additions will increase output about 100 tons of castings a day, and will place the company in a position where it will make all of its gray iron castings."

Federal Mogul Shows Earnings

DETROIT, Jan. 14—Federal Mogul Corp. earnings for the year just ended are reported at between $3.50 and $3.75 per share on the 140,000 shares of common stock outstanding. Recent new contracts received for 1929 indicate a large increase in earnings this year. A new addition to the main plant is now underway and will reduce operating costs considerably.

Cunningham Joins G. M. Truck

DETROIT, Jan. 16—John H. Cunningham, for the past three years in charge of vocational truck advertising for Dodge Brothers, has resigned to join the advertising staff of the General Motors Truck Co.

L. A. Young Shares Earn $6

DETROIT, Jan. 14—L. A. Young Spring & Wire Co. earnings for the year just ended amounted to approximately $6 per share on the 330,000 shares of common stock outstanding. January promises to be the biggest month in the history of the company. Several departments are operating night shifts at present and it is expected that others will go on a two-shift basis within the next week.

Auburn Buys Central, Ryan Vice-President

AUBURN, IND., Jan. 15—Ellis W. Ryan, formerly vice-president and general manager of the Central Mfg. Co. at Connersville, Ind., has been elected a vice-president and director of the Auburn Automobile Co., in charge of operations at Connersville.

The Auburn company has purchased the business and assets of the Central company at Connersville. Central body works are adjacent to the existing Connersville plants of Auburn and the entire properties will be consolidated, furnishing a total floor space of over 1,500,000 sq. ft. and having a capacity of 250 cars a day. Auburn has recently spent over $150,000 for new buildings and equipment, including a new conveyor system over three miles long.

Oil Producers Combine in Export Association

NEW YORK, Jan. 15—The Export Petroleum Association, Inc., has been incorporated in Delaware as an export organization within the American petroleum industry under the Webb-Pomerene Act. Most of the larger American oil companies are included in the association. The purpose of the association is to effect all possible economies in foreign business such as the duplication of marketing facilities and other costs affecting distribution.

The companuies which thus far have become members of the association are Atlantic Refining, Cities Service, Gulf Refining, Marland Oil, Richfield Oil of California, Shell-Union Oil, Sinclair Consolidated Oil, Standard Oil of California, Standard Oil of Indiana, Standard Oil Export Corporation, representing operating units affiliated with the Standard Oil Company of New Jersey; Standard Oil of New York, Tidewater Associated Oil, Union Oil of California, Vacuum Oil and Texas Corporation.

Lowrie C. Blanding

MOLINE, Jan. 12—Lowrie C. Blanding, aged 60 years, for many years secretary of the old Moline Plow company prior to its reorganization in 1922, which was followed later by its acquisition by the International Harvester company, died Jan. 5 in his home in Moline.

Alden on Bank Board

DETROIT, Jan. 14—Colonel H. W. Alden, chairman of the Timken-Detroit Axle Co., was recently added to the directorate of the Commonwealth-Commercial State Bank, Detroit.

Financial Notes

Allis-Chalmers Mfg. Co. has extended to stockholders of record Jan. 25 the rights to subscribe to 26,000 additional shares at $140 a share on the basis of one new share for each 10 shares held. Rights will expire on Feb. 20. Proceeds from the sale will be used for enlargement of the company's tractor plant and to maintain its working capital. Regular quarterly dividend has been declared payable Feb. 15 to holders of record Jan. 25.

Lee Rubber & Tire Corp. earned 55 cents a share on 300,000 shares of capital stock in year ended Oct. 31 against $2.76 on 293.-261 shares in ten months ended Oct. 31, 1927.

Borg-Warner Corp. has extended its stockholders of record Jan. 24 the right to purchase at $100 one additional share of stock for every 10 shares now held. This right will expire Feb. 11. The proceeds will be used for the purchase of the Long Mfg. Co. of Detroit.

Charles D. Velie Dies 3 Months After Brother

CHICAGO, Jan. 15—Charles Deere Velie, 67, vice-president of the Deere & Webster Co., died yesterday at his home in Minneapolis following a long illness. He was in charge of the Minneapolis branch of the organization.

Mr. Velie was born at Rock Island, Ill., March 20, 1861, and had been in Minneapolis since 1883. He was a grandson of John Deere, inventor of the John Deere steel plows and founder of Deere & Co. in 1858.

Mr. Velie also was a director of Deere & Co., the John Deere Plow companies at Omaha, St. Louis, Dallas, Tex., Indianapolis and Winnipeg.

Mr. Velie is survived by his widow and four children. W. L. Velie, head of Velie Motor Corp., who died Oct. 24, was a brother.

Morton Succeeds Stettinius

BALTIMORE, Jan. 14—W. C. Stettinius, who resigned as president and general manager of the American Hammered Piston Ring Co. on Dec. 31, has been succeeded by Allen W. Morton. Mr. Stettinius will continue his affiliation with the company as vice-chairman of the board of directors. The new president has been connected with the firm for the past 10 years and has been vice-president for the past three years.

Husky Moves to Kenosha

KENOSHA, Jan. 14—The Husky Corp., which up to Jan. 1 was known as the Husky Wrench Co., has moved into its new factory here prepared to manufacture a number of new lines of products. The new plant occupies 40,000 sq. ft. of an 11-acre site on the shores of Lake Michigan. In the office building is a permanent display of Husky socket wrenches and other products of the firm.

Congress Bans Use of Liberty Engines in New Army Planes; 4000 Still on Hand

WASHINGTON, Jan. 17—The House of Representatives has placed an official ban on the use of Liberty engines in the new army airplanes to be purchased by the Government during the next fiscal year.

During consideration of the War Department appropriation bill, carrying an item of $33,000,000 for the army air corps, Congressman LaGuardia, Republican, New York, who was a World War aviator, offered an amendment forbidding the use of Liberty engines in new aircraft, which was promptly adopted.

Many war-time planes engined with obsolete Liberty engines are being used as training planes, Mr. LaGuardia said. These planes, he said, are not only uneconomical, but dangerous to flyers using them. He quoted testimony of Assistant Secretary of War Davison and General Fechet, who said they had no end of trouble with Liberty engines used in their flight to Panama last year.

The War Department has about 4000 of these old engines on hand, Mr. LaGuardia pointed out. Other engines are about three times as safe as the Liberty, he told the House, again citing the testimony of General Fechet.

Mr. LaGuardia also opposed the sale of these engines to civilian aviators, adding that he felt the army would be justified in junking them.

G. W. Fleming Heads New Automotive Products Firm

WORCESTER, MASS., Jan. 14—The Fleming Machine Co. of Worcester, Mass., has turned over its small tool division to the newly-formed Fleming Mfg. Co., Inc., Worcester. G. W. Fleming, a former director of the Automotive Equipment Association, and chairman of the international trade committee of the National Standard Parts Association, is president of this new company. S. B. Wilson, formerly president of Wilson & Co., sales manager of Service Station Equipment Co. and assistant sales manager of McCord Radiator & Mfg. Co., is vice-president and general manager. Charles F. Davis, president of Stafford Iron Works, Inc. of Worcester, is treasurer. The Fleming Mfg. Co., Inc., will manufacture and market the Fleming line of precision tools, the Fleming screw driver, and Marnall steel lubricating pits. All of these lines will be marketed as before through established jobbing channels.

New Departure Increases Ball Bearing Capacity

BRISTOL, CONN., Jan. 12—The new forge plant of the New Departure Mfg. Co., which is reported ready for use, will increase the company's production capacity from 160,000 to 175,000 ball bearings daily. Additional machinery is being installed in the other plants to keep pace with the increased facilities.

Work on the new building, which is 200 ft. long by 126 ft. wide, was begun in September. It will house two cranes with a capacity of 10 tons each and 12 heavy duty forging machines, one of which is to be the largest ever built.

New Roadway is Planned

NEW YORK, Jan. 12—Final approval has been granted for the construction of an express highway running along the Hudson River extending from Canal Street, at a point convenient to the Holland Tunnel, northward to a connection with Riverside Drive at Seventy-second St. Plans are expected to be in the hands of contractors within a few days.

Borg-Warner Merger With Coulter Approved

CHICAGO, Jan. 12—Another big merger of Chicago concerns in the automotive field was consummated last night. The proposed consolidation of the Borg-Warner Corp. and the Galesburg-Coulter Disc Co. was declared effective.

It was announced that holders of 85 per cent of the stock of the Galesburg-Coulter company had deposited their stock in assent to the merger, which calls for the exchange of one share of Borg-Warner stock for each Galesburg-Coulter share. The Borg-Warner corporation now has 410,000 shares outstanding and will issue an additional 100,000 shares to the Galesburg-Coulter stockholders.

Thereafter, it is understood, the Borg-Warner corporation will offer an additional 51,000 shares at $100 a share to stockholders in the ratio of one new share for each 10 shares held.

Delco Makes 33,000 Batteries

DAYTON, Jan. 14—Shipments of individual electric plants during the year ended Dec. 31, 1928, by the Delco-Light Co., subsidiary of General Motors, totaled 25,318 units, it is announced by H. W. Arnold, general manager. Battery shipments totaled 33,000 and "D-L" electric water systems totaled 10,002 during the year.

Opens New York Office

CHICAGO, Jan. 12—Foote Bros. Gear & Machine Co. has announced the recent establishment of a New York branch office, in the Woolworth Building, which will be under the management of E. A. Phillips. The new office is to be in charge of the distributing organization in Eastern territory, covering the lines manufactured by the Bates Tractor, Stockland Grader & Road Equipment, Lyle Culvert & Road Equipment and Northwestern Steel & Foundry divisions, four companies in which Foote Bros. recently has acquired interests.

G. M. to Establish New Factory in South Africa

NEW YORK, Jan. 14—The General Motors Corp.'s South African subsidiary (General Motors, S. A., Ltd.), recently purchased 40 acres at Port Elizabeth, Union of South Africa, on which it will erect a factory for the assembly of automobiles. It is intended to spend about $1,250,000 on this plant, which is to be completed by the end of 1929. At its present works the corporation assembles about 100 cars per day, and it is stated that since this plant was established in 1926 about $10,000,000 has been invested in South Africa by the corporation, which now employs about 800 persons there.

Graham-Paige Opens New $1,500,000 Evansville Plant

EVANSVILLE, IND., Jan. 14—The new $1,500,000 plant of Graham-Paige Body Corp. begins production today with a force of 200 men transferred from the Motor Bodies, Inc., plant here. This force will be the nucleus of an employee organization that will by Feb. 1 number 1000, according to C. R. Stone, secretary.

For the first 10 days of operation production will be confined to open car bodies. This schedule will be followed by production of the four-door and two-door sedan models. The former Motor Bodies, Inc., plant will be retained for sheet metal department.

Builds Plane Carburetors

DETROIT, Jan. 12—Stromberg Carburetor Co., Chicago, has started manufacturing airplane carburetors on a large scale. President C. W. Stigers said at present the aircraft business is running at the rate of $1,500,000 to $2,000,000 a year, with indications that this will be doubled by the end of 1929. The company's production schedule on all lines is 50 per cent ahead of the previous record.

Tourek in New Plant

CHICAGO, Jan. 12—J. J. Tourek Mfg. Co. has removed its offices and plant into its new building at 4616 West Twentieth St., where it will continue its production of ball joints and screw machine products.

Allis-Chalmers Adds Drives

MILWAUKEE, Jan. 14—Allis-Chalmers Mfg. Co. has increased its stock of Texrope drives to include all popular motor speeds and ratings up to 50 hp. A previous enlargement in the company's stock was made in 1927 to include drives from 2 hp. up to 15 hp.

St. Louis Aircraft Starts Production

Will Build 750-lb. "Cardinal" in Part of St. Louis Car Plant

ST. LOUIS, Jan. 14—The "Cardinal," a two-place cabin monoplane manufactured by the St. Louis Aircraft Corp., a subsidiary of the St. Louis Car Co., has passed successful tests at Scott and Lambert-St. Louis Fields and is to be placed in production immediately, officials of the aircraft company announced.

The ship, which weighs 750 lb. with fuel, is of sturdy construction and caused favorable comment from experts who saw it perform. The wing is 32 ft. long of steel construction with some spruce spars. The fuselage frame is of hollow steel tubing, and measures 22 ft. from nose to tail. A five-cylinder LaBlond air-cooled engine, developing 75 hp., was used in the test job and this or a similiar power unit will be used in the plane placed in production. Cruising speed is 85 m.p.h. and tests proved that the ship will handle easily in various flying positions. The gasoline capacity is 25 gallons and consumption is at the rate of 20 miles a gallon.

A portion of the St. Louis Car Co. plant, 8000 North Broadway, has been turned into an airplane factory and plans for distributing the plane are being completed.

The St. Louis Aircraft Corp. manufactured planes for the Government during the war, but became inactive following the armistice. Plans for the construction of a five-passenger plane are being laid, officials of the concern announced. The larger plane will resemble the smaller ship in general appearance.

Olsen Joins Bellanca

PHILADELPHIA, Jan. 15—G. E. Olson, for 10 years construction superintendent at the naval aircraft factory, Philadelphia, has joined Bellanca Aircraft Corp., New Castle, Del., as production manager. Previous to undertaking the naval aircraft work, Mr. Olson, for three years, was in charge of final assembly operations at the Ford Motor Co., Philadelphia branch.

The Bellanca company is erecting a new factory which will start operation on the basis of one plane a day, building a six-passenger cabin monoplane which will be sold for general commercial use.

Forms Emsco Aero Engine

LOS ANGELES, Jan. 12—E. M. Smith, local manufacturer, announces the formation of the Emsco Aero Engine Co. to manufacture Diesel engines for use in aircraft. A plant has been established in Southgate, where experiments on the new engine have been in progress for several months. Detalis of the design and other technical information have not yet been released.

G. E. Electric Orders Rise to $348,848,512

SCHENECTADY, Jan. 12—Orders received by the General Electric Co. during the year 1928 amounted to $348,848,512 compared with $309,784,623 for 1927, an increase of 13 per cent, President Gerard Swope announced. The orders for the December quarter amounted to $88,162,049 compared with $76,708,532 for the last quarter of 1927, an increase of 15 per cent.

Chandler Stock Deposits Make Hupp Plan Operative

NEW YORK, Jan. 14—Bankers handling the exchange of Chandler-Cleveland stock for Hupp Motor Car Corp. stock have announced that holders of Chandler-Cleveland stock depositing this stock on or before Jan. 21 will be entitled to receive 2½ per cent stock dividend and 50 cents cash dividend on the Hupp stock, equivalent to the deposited Chandler stock. This dividend is a regular dividend on Hupp stock previously declared payable Feb. 1 to holders of record Jan. 21.

This stock exchange which is being handled on the basis of one share of Hupp common for each two shares of Chandler preference and one share of Hupp common for each 3½ shares of Chandler common, has reached a point where the bankers have declared the exchange operative. Certificates of deposit will be exchanged for Hupp stock on and after Jan. 23.

Canadian Exports Decline 9.5 Per Cent in November

WASHINGTON, Jan. 17—Canadian automotive exports during November declined 9.5 per cent in number and 7.6 per cent in value, as compared with the preceding month, according to the U. S. Department of Commerce. Motor vehicles shipped in November numbered 8783, having a value of $3,640,384, as against 9705 with a total value of $3,941,208 shipped in October. Shipments of passenger units declined but truck exports increased. November exports showed a tremendous increase when compared with those for November, 1927.

Try New Steam Power-Plant

NEW YORK, Jan. 14—Steam Production Corp., organized about a year ago to produce steam power-plants for motor vehicles, has had a sample engine made and is at present trying it out in a Yellow Truck chassis. It is the plan of this company, headed by Dr. William McClellan of the engineering firm of McClellan & Junkersfeld, to produce these engines in quantity for use in highway trucks and buses and for industrial service. Complete production plans are not yet ready.

Timken Axle to Buy Wisconsin Parts Co.

Transaction Will be Handled on Exchange of Stock Basis —Vote Jan. 22

CHICAGO, Jan. 15—Directors of the Wisconsin Parts Co. have approved the sale of the company to the Timken-Detroit Axle Co., W. R. Rockwell, president of the former, today advised stockholders. The transaction will be handled through an exchange of stock on the basis of 2¼ shares of common stock of the Timken-Detroit Axle Company for one share of Wisconsin Parts.

Letters have been mailed Wisconsin Parts stockholders advising them of a special meeting to be held Jan. 22 at Oshkosh, Wis., to vote on the proposed sale of the company. The plan calls for the issuance by Timken-Detroit of 157,500 shares of $10 par common stock in payment for assets of the Wisconsin Parts Co. This will permit the exchange on the basis of 2¼ shares for one.

Wisconsin Parts Co. was incorporated in Wisconsin in May, 1919. Its business consists of the manufacture of front and rear axles for trucks ranging in capacity from 1½ to seven tons. Rear axles comprise over 95 per cent of the company's production. The company also manufactures a line of other products including roller bearing journal boxes and tractor transmissions.

Timken-Detroit Axle Co. engages in a similar business. Its outstanding capitalization consists of $3,842,100 or $100 par 7 per cent preferred stock and $8,345,960 of $10 par common stock.

R. B. Batchelder Dies

DETROIT, Jan. 14—Roland B. Batchelder, district manager for the Oakland Motor Car Co., with headquarters at Chicago, died there Thursday, of pneumonia, the day after being appointed sales manager of the company offices at Pontiac. Mr. Batchelder was born in Salem, Mass. He was 37 years old and a Harvard graduate. Previous to joining the Oakland organization a year ago he was an executive of General Motors Acceptance Corp.

Parks Schedules 400 Output

ST. LOUIS, Jan. 15—Parks Aircraft, Inc., controlled by Gardner Motor Co., plans an airplane production schedule of 300 to 400 planes for 1929. It will build two types of ships: a high wing, four-place monoplane and a smaller training ship. Production is expected to start about Feb. 1.

Buchen Opens Office

CHICAGO, Jan. 14—The Buchen Co. has announced that it will open a service office in Philadelphia this week. W. H. Baers will be in charge of the branch which is to be located at 123 South Broad St.

Steel Mills Prepare for Record Demand

Tonnages Steadily Increase Though Buying is Mainly for Current Needs

NEW YORK, Jan. 17—Steadily increasing tonnages of sheets, strip-steel, cold-finished and alloy steel bars, etc., are being called for by automotive consumers, and yet producers say that incoming orders, as disclosed by shipping instructions, represent only the current needs of buyers. That the steel market's character has become a pronounced automotive affair, is shown by the brisk demand for full-finished automobile sheets, while there is nothing spectacular about the movement of ordinary sheets, and much of this too is for automotive account.

So far as the price outlook is concerned, the very prompt reaction of the steel market to predictions of greatly increased automobile output this year has been that these predictions are the best possible answer to any fault-finding with prices. Steel market skeptics, those who thought that the automotive industries could never attain first place among steel-consuming industries, as was the case in 1928, make light of predictions of a 6,000,000-car year in 1929.

On the other hand, progressive steel producers are beginning to give some serious thought to preparedness for just such an upswing in automotive sales. Sheet-finishing mills are operating close to capacity now. Capacity, however, in the steel industry has frequently been found to be a more or less flexible term. It is hoped that the ascent toward higher production levels will be sufficiently gradual to permit of an orderly stepping up of schedules. In short, it is recognized that automotive demand may grow to such proportions this year that it will become a real problem of how to meet it, but if that pleasing prospect should be materialized, the steel industry will find ways and means of meeting the problem. What the steel producers naturally would like to see is that, in view of the possibilities of heavily increased demand, some automotive consumers would decide to anticipate their requirements somewhat more liberally, so as to make sure of not being caught in the jam, if it does come.

Pig Iron—Automotive foundries continue to order forward shipments of pig iron due them on first quarter contracts. New business is rather light. The Valley market remains at $17.50 to $18.00, furnace, and the Michigan price at $20.

Aluminum—Market conditions are devoid of fresh developments. The German aluminum industry, seven-eighths of which is owned by the government, plans a dual measure of defense against American competition, the imposition of a duty on imports of crude metal and the lowering of sales prices. The Germans figure that with the many plant additions being made by the American producer in Canada, Norway, etc., world output will increase from 210,000 to 320,000 tons a year. The domestic producer is adding a new rolling mill at its Tennessee plant for the production of strong aluminum alloy sheets of all grades and sizes.

Copper—Uneasiness over the possible inadequacy of supplies continues. The market continues tight at 16¾ cents, delivered Connecticut, and 16⅞ cents, delivered Middle West.

Tin—The market shows slightly greater firmness, consuming demand being fair.

Lead—Small lot buying by storage battery manufacturers is noted. The market is steady.

Zinc—Consuming demand is quiet, prices remaining unchanged.

Meetings and Events Scheduled for Chicago Show

Jan. 25	Chicago Auto Trade	Dinner	6.30 P. M.	Palmer House
Jan. 25	Cadillac	Dinner		Blackstone
Jan. 26-Feb. 2	Locomobile Co.	Meeting	2.00 P. M.	Blackstone
Jan. 26-Feb. 2	Hupp Motor Co.	Luncheons	12.45 P. M.	Stevens
Jan. 28	Studebaker	Dinner	7.00 P. M.	Palmer House
Jan. 28	Graham-Paige	Luncheon	12.30 P. M.	Palmer House
Jan. 28-29	N.A.D.A.	Convention		Palmer House
Jan. 28-29	Packard Motor Co.	Meetings		Blackstone
	(Exclusively for Packard Distributors)			
Jan. 28	N.A.D.A.	Meeting	10.00 A. M.	Palmer House
Jan. 28	Packard Motor Car Co.	Dinner	6.30 P. M.	Blackstone
Jan. 29	N.A.D.A.	Dinner	6.30 P. M.	Palmer House
Jan. 29	Nat'l Automobile Dealers Assoc.	Banquet		Palmer House
Jan. 29	Oakland	Dinner	6.30 P. M.	Palmer House
Jan. 29	Auburn	Luncheon	1.00 P. M.	Stevens
Jan. 29	Nash Sales Corp.	Luncheon		Congress
Jan. 29-30	Auto. Elec. Assoc.	Meeting	10.00 A. M.	Stevens
Jan. 30	N.A.C.C. Directors	Meeting	10.00 A. M.	Auditorium
Jan. 30	Chrysler	Luncheon	12.30 P. M.	Congress
Jan. 30	Peerless	Dinner	6.30 P. M.	Congress
Jan. 30	Willys-Overland	Dinner	7.00 P. M.	Palmer House
	(Admittance by card only)			
Jan. 30	Franklin	Luncheon		Blackstone
Jan. 30	Natl. Association of Show and Association Mgrs.	Meeting and Luncheon		Drake Hotel
Jan. 30	Olds Motor Works	Banquet		Congress
Jan. 30	Gardner Motor Co.	Luncheon	1.00 P. M.	Blackstone
Jan. 30	Jordan Motor Car Co.	Luncheon	12.30 P. M.	Stevens
Jan. 30	Gardner Motor Car Co.	Luncheon	1.00 P. M.	Blackstone
Jan. 31	Durant Motors	Luncheon	12.30 P. M.	Palmer House
Jan. 31	Reo	Dinner		Congress
Jan. 31	De Soto Motor Co.	Luncheon		Congress
Jan. 31	Marmon Motor car Co.	Luncheon		Blackstone
Jan. 31	Buick Motor Car Co.	Meeting		Blackstone
Feb. 1	Chevrolet	Meeting	1.30 P. M.	Majestic Theater
Feb. 1	Chevrolet	Banquet	6.30 P. M.	Palmer House

Curtis Export Spreads

NEW YORK, Jan. 15—The Curtiss Export Corp. has entered into a contract with Curtiss-Reid Aircraft Co. of Montreal to sell the products of the latter company in Latin America. The export company has already made an initial purchase of airplanes and accessories for early shipment.

Expands Flying Service

NEW YORK, Jan. 15—Curtiss Flying Service, Inc., has purchased the New England Aircraft Co. of Hartfort, Conn., and Worcester, Mass. The company has two flying fields.

Kulas Sees Car Output Taxing Steel Facilities

CLEVELAND, Jan. 12—Capacity operations for many departments of the Otis Steel Co. have been inaugurated since the beginning of the year. Production schedules are being expanded with the increase in orders from the automobile industry and other large consumers.

"Business now in sight indicates the most active first quarter in the company's history," said President E. J. Kulas. "Demand is larger not only from the automobile industry but railroad demand has increased. I expect that during the first six months motor car output may reach 3,000,000 units. Such a production would tax the facilities of steel mills over the next few months. In 1928 for the first time the automobile industry became the largest user of finished steel, surpassing both the railroads and the building industry."

Briody Succeeds Snoddy

DETROIT, Jan. 14—T. F. Briody has been appointed manager of the Studebaker Corp. of America's Portland, Ore. branch. He succeeds J. A. Snoddy, who has resigned. Mr. Briody has been with Studebaker since 1925, recently as assistant manager in San Francisco.

Ford of Canada Loss $4,000,000 in 1928

Campbell Denies Reports of Stock Issue or Purchase by Henry Ford

FORD CITY, ONT., Jan. 15—Wallace R. Campbell, vice-president and treasurer of Ford Motor Co., of Canada, Ltd., in a statement today designed to offset the speculation of Ford of Canada stock, said the financial statement of the company for 1928 will show a deficit of approximately $4,000,000 and that there is not the "slightest possibility of a dividend being declared in 1929." Mr. Campbell said further:

"I am calling the public's attention to this matter," Mr. Campbell said, "only because we are being besieged with inquiries from many sources and I believe that it is incumbent upon us to make a statement. Reports have gone around that the Canadian Ford Co. earned a profit of $5,000,000 in 1928. As a matter of fact, we shall have a deficit of approximately $4,000,000. All the figures are not yet available, but there is little doubt that the loss will reach that figure.

"I would call attention also to the rumors in circulation as to possible issue of new stock. The directors have never at any time considered such a move. I fancy that the issuance of stock for Ford Motor of England has given rise to this idea.

"I give positive denial also to the rumor that Henry Ford and members of his family are trying to acquire all of the stock of the Canadian company.

"If anything were needed to show that the present speculation is unwarranted, let investors consider the fact that the company's surplus has been impaired to the extent of approximately $60 per share by the losses incurred in 1928. As a matter of fact, the company lost approximately as much last year as it ever made in biggest profit-making year. And, as I have said, there is no prospect of a dividend in 1929, although we naturally expect to improve our position."

Adams Urges Changes Abroad

PHILADELPHIA, Jan. 15—Hugh L. Adams, vice-president of the Edward G. Budd Mfg. Co., who recently returned from a tour of the European body plants in which the Budd company is interested, says traffic conditions in Europe in a few years will be even worse than in the United States now, unless authorities begin immediately to redesign cities.

Servel to Spend $250,000

EVANSVILLE, IND., Jan. 12—Servel, Inc., including Hercules Products, Inc., will spend $250,000 in new plant buildings and equipment this year to take care of increased orders. Hercules Products is building bodies at the rate of about 200 a day, he said.

Cadillac Favors Plane Advertising

NEW YORK, Jan. 15—Cadillac Motor Car Co. was so pleased with the results of the advertising stunt involving the flight at night of an airplane over New York City during the automobile show that it will utilize the same plane in connection with six other shows. Advertising matter, outlined in Neon lights, is displayed from the under wing of the craft.

This week the plane will fly over Newark, N. J., in connection with the show in that city. Later it will be used in connection with the shows in Philadelphia, Brooklyn, Cleveland, Detroit and Chicago.

Two Companies Negotiate Velie Car Manufacture

MOLINE, Jan. 12—Velie Motors Corp. is on the market and negotiations are under way with two potential buyers to take over the entire factory, W. L. Velie, Jr., who has succeeded his father, W. L. Velie, Sr., who died two months ago, announced today.

The Velie interests, however, are not negotiating with the American Eagle Aircraft Corp. of Kansas City or any of its representatives looking toward sale of the factory or any part of it, Mr. Velie said, in contradiction to press dispatches from New York City this week, which stated that "negotiations had been virtually completed" to take over Velie Motors.

One of the prospective purchasers, if his proposition is successful, plans to resume manufacturing of the Velie car, Mr. Velie said, but automotive manufacture has been suspended by the present ownership and will not be undertaken under the Velie management.

Eclipse Sale to Bendix Handled Through G.M.C.

CHICAGO, Jan. 17—Announcement of a new stock issue today by Bendix Corp. was accompanied by a statement of Vincent Bendix, president, showing that the recent purchase of the majority interest in Eclipse Machine Co., Elmira, was financed by General Motors Corp. Acting as agent for Bendix, General Motors interests bought Eclipse stock for cash and resold to Bendix at cost on a five-year payment plan. A total of $5,448,000 is to be paid to General Motors by Bendix in four instalments.

Westinghouse Elects Robertson

NEW YORK, Jan. 17—Andrew W. Robertson has been elected chairman of the board of Westinghouse Electric & Mfg. Co., succeeding the late Guy E. Tripp.

Hercules Motor Has Profitable 12 Months

Record Business Foreseen With Same Directors and Officers in Charge

CANTON, OHIO, Jan. 15—Hercules Motor Co. reports an exceptionally prosperous year in 1928, its business increasing slightly in excess of 50 per cent over the year previous, with profits also increasing. A second dividend of $2.50 per share was paid Jan. 2, 1928, making a total of $5 per share paid for the year 1928.

All indications point to an even greater increase in volume of business for the year 1929 than the increase over the year just closed, as at the present time the company has orders unfilled to be delivered during 1929 in excess of the total number of units shipped during 1928.

All directors and officers of the company were reelected recently. The officers are H. H. Timken, chairman of the board; E. A. Langenbach, president; Chas. Balough, vice-president and general manager, and H. P. Blake, secretary. The following directors were reelected: H. H. Timken, E. A. Langenbach, R. W. Gallagher, Gordon Mather and Chas. Balough.

Sloan Praises Feat in Chevrolet Output

NEW YORK, Jan. 12—Sales and service plans for 1929, including the handling of 1,250,000 cars and the establishment of eight new parts warehouses, were presented to 2500 dealers by executives of Chevrolet Motor Co. at two meetings here Friday.

Alfred P. Sloan, Jr., president of General Motors Corp., paid tribute to the entire Chevrolet organization for the quickness and efficiency with which they changed from four to six-cylinder models. As a means of overcoming manufacturing difficulties a complete experimental plant, equipped at a cost of approximately $1,000,000, went into operation last August and on the results of experiences gained from this operation, Chevrolet production engineers were able to determine production methods to be followed in regular practice. Creation of this plant, said Mr. Sloan, was the idea of W. S. Knudsen, president and general manager of Chevrolet.

Ayres Sees Record Half

DETROIT, Jan. 17—In an address before the Detroit section of the American Statistical Society Wednesday night Col. Leonard P. Ayres predicted that automobile companies will enjoy record-breaking production during the first-half of this year. John Scovill, statistician for the Chrysler Corp., presented charts showing studies he had made in projecting market trends.

Air-Cooled Engines Gaining, Says Stout

NEW YORK, Jan. 14—While aviation in its early days was largely dependent upon the automotive industry, it is today making many valuable returns to that industry, W. B. Stout of the airplane division of Ford Motor Co. told several hundred Franklin dealers at the Franklin president's luncheon for dealers at the Commodore this week.

The balloon tire, pyroxylin lacquers, which made possible mass production on closed bodies, and refinements in metal structure, are some of the valuable contributions which the airplane has made to the automobile, as pointed out by Mr. Stout.

Mr. Stout also stressed the importance of air-cooled engines for both types of transportation and predicted the day a few years hence when all automobiles will have air-cooled engines. The light weight, also a common characteristic of airplanes and the Franklin car, Mr. Stout also indicated as developments which the whole industry will adopt sooner or later.

In addition to Mr. Stout's address, entertainment was furnished by Will Rogers, the well-known comedian, and the Happiness Boys, radio singers.

Merge Aero Companies

NEW YORK, Jan. 12—Consolidated Instrument Co. of America, Ltd., sales organization handling airplane instruments and accessories, has acquired control of Julian L. Friez & Sons, Baltimore, and Moulded Insulation Co., Mount Vernon, N. Y. The Friez company, which will retain its name under the new merger, manufactures meteorological, hydrometric and aeronautical precision instruments. The transaction has been financed by the issuance of 55,000 shares of common stock in Consolidated to bankers who will offer it to the public at $12.50 a share.

Fairchild Exports 8 Planes

NEW YORK, Jan. 14—Fairchild Airplane Mfg. Corp., Farmingdale, L. I., reports export sales last week of eight monoplanes totaling $193,000. Three of these planes were shipped to Canada, where they will be used in aerial gold exploration, two will be shipped to Mexico, where they will be used for mail and passenger routes, and the other three, which will be used for mail and passenger lines, will be shipped to Chile, Peru and Costa Rica, respectively.

Coming Feature Issue of Chilton Class Journal Publications

Feb. 23—Statistical Issue Automotive Industries.

Jordan Planning Output of 60 Daily in February

NEW YORK, Jan. 12—"Jordan Motor Car Co., having ended a year of refinancing and reorganization, is on its feet and expects to sell from 8000 to 10,000 cars in 1929," said John McArdle, vice-president and general manager, this week to a luncheon meeting of dealers and distributors which established a Jordan record for attendance.

"Six months ago," Mr. McArdle declared, "the Jordan company didn't have a cent in the bank and owed $1,500,000. Today we have $1,500,000 in the bank and don't owe a cent."

Jordan now has representation in 32 foreign countries, Mr. McArdle revealed, and in 1928 its exports were 115 per cent better than in 1927. This year's total is expected to exceed 1928 by the same percentage.

President Edward S. Jordan told dealers and distributors that the company would return to what he termed the "Jordan ideal" of operation, which sacrifices volume production, thus eliminating overload of dealers, and enables each dealer to operate profitably.

L. F. Murphy, sales manager, who acted as toastmaster, said January production would total about 200, mostly eights, but that in February the factory would operate on a schedule of about 60 cars a day.

Dixie-Burton to Build

DETROIT, Jan. 12—Operations will start soon on the construction of a factory in Lansing for the Dixie-Burton Corp., manufacturer of springs, cushions and felts for automobiles and furniture. The Dixie-Burton corporation, with headquarters in Chicago, now operates six plants throughout the country. The industry it will set up in Lansing will represent a $250,000 investment.

Dryden Adds to Plant

CHICAGO, Jan. 12—Dryden Rubber Co. announces additions to its plant and installation of new equipment at a total expenditure of approximately $300,000 in order to meet increased business.

Samson Tire Starts New $8,000,000 Plant

LOS ANGELES, Jan. 12—The growing importance of southern California in the rubber world is given further emphasis by the announcement that the Samson Tire & Rubber Corp. will start work shortly on a new $8,000,000 factory here. The new Samson factory will practically double the production capacity of the local company which has been under the handicap of factory limitations for the last year or two. The new plant will provide an output of 6000 tires and 10,000 tubes daily, will employ 2500 people, and will have an annual payroll of over $2,500,000. This will bring the total daily rubber output of Los Angeles up to over 25,000 tires and 40,000 tubes daily.

The Samson Tire & Rubber Corp. was founded by A. Schleicher, its president, eleven years ago in a small shack in Compton. From this meager beginning, the company has advanced steadily, gaining a foothold on the coast and later extending its sales to the Atlantic Seaboard to take advantage of the competitive freight rates through the Panama Canal. The Gulf States were next covered for the same reason, and from there operations spread into the interior until now the entire nation is a market for Samson tires.

Federal Screw Faces Growth

DETROIT, Jan. 12—The directors of the Federal Screw Works, who were reelected at the annual meeting Jan. 8, declared an extra dividend of 25 cents per share for January, payable Feb. 1, to stock of record Jan. 28. Shipments in 1928 amounted to $2,675,372 greater than in any other year of the company's history. With the acquisition of the Chelsea Screw Co., the outlook for 1929 is considered even greater. Federal Screw's expansion program is nearly completed and will permit approximate doubling of production.

Expands Body Operations

ELYRIA, OHIO, Jan. 12—Six hundred employees will be added to the force of the Falcon Motor Corp. during the coming month, it was announced Friday by officials of the automobile plant here. By March 1 the plant will be producing 260 coupe bodies and 75 one-ton trucks a day. On that date, it was said by officials, manufacture of Falcon-Knight automobiles will have ceased and the plant will become a unit of the Willys-Overland Co.

Calendar of Coming Events

SHOWS

All-American Aircraft Show, Detroit Board of Commerce, Detroit..Apr. 6-14

Automobile Salon, Inc., Hotel Drake, Chicago .....Jan. 26-Feb. 2

Automobile Salon, Inc., Hotel Biltmore, Los Angeles.....Feb. 9-16

Automobile Salon, Inc., Palace Hotel, San Francisco .....Feb. 23-Mar. 2

Boston, Mass., Mechanics Bldg...March 2-9

*Chicago, National, Coliseum, Jan. 26-Feb. 2

Geneva Automobile Show .....Mar. 15-24

Leipzig, Germany, Fair.....Mar. 3-13

Melbourne Automobile Show.....May 2-11

Rome Automobile Show.....Jan. 30-Feb. 16

CONVENTIONS

Chicago Power Exhibition and Conference, Coliseum, Chicago....Feb. 12-16

National Automobile Dealers Association, Palmer House, Chicago..Jan. 28-29

* Will have special shop equipment exhibit.